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REPORT RESUMES

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SYSTEMATIC VARIATION OF CERTAIN CONDITIONS RELATED TO LEARNING IN THE MENTALLY RETARDED--REINFORCEMENT.

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DESCRIPTORS- *RETARDED CHILDREN, GIFTED, INDIVIDUAL DEVELOPMENT, *LEARNING EXPERIENCE, ACHIEVEMENT GAINS, *ASPIRATION, POSITIVE REINFORCEMENT, *REINFORCEMENT, CORRECTIVE INSTITUTIONS, PUBLIC EDUCATION, *TASK PERFORMANCE, INDIVIDUAL CHARACTERISTICS, NEW YORK, SYRACUSE, ATHENS, GEORGIA

THE WORK OF AN EARLIER COOPERATIVE RESEARCH PROJECT (NO. 470) WAS EXTENDED THROUGH THIS INVESTIGATION BY COMPARING THE MOTIVATIONAL CHARACTERISTICS AND LEARNING PERFORMANCE OF A GROUP OF INSTITUTIONALIZED MENTALLY RETARDED CHILDREN WITH GROUPS OF SUPERIOR, NORMAL, AND MENTALLY RETARDED NONINSTITUTIONALIZED SUBJECTS. DATA ON THE NONINSTITUTIONALIZED SUBJECTS WERE OBTAINED PARTIALLY FROM THE EARLIER STUDY. COMPARATIVE ANALYSES WERE ACCOMPLISHED BY EXAMINING THE INTERACTIONS OF SELECTED REINFORCEMENT, TASK, AND SUBJECT VARIABLES ON LEARNING PERFORMANCE AND LEVEL OF ASPIRATION BEHAVIOR. PROJECT VARIABLES ARE LISTED BELOW--(1) "REINFORCEMENT" (TYPE SUCCESS OR FAILURE, FREQUENCY, AND ORIENTATION), (2) "TASK" (LEVEL OF COMPLEXITY AND EXTENT OF OVERT VERBALIZATION), AND (3) "SUBJECT" (INTELLIGENCE LEVEL, CHRONOLOGICAL AGE, SEX, AND PLACEMENT TYPE). FOUR SAMPLES OF APPROXIMATELY 100 SUBJECTS EACH (RETARDED, NORMAL, AND SUPERIOR PUBLIC SCHOOL STUDENTS AND RETARDED CHILDREN FROM INSTITUTIONS) WERE ADMINISTERED TASKS INDIVIDUALLY IN CONJUNCTION WITH 12 BASE CELLS, FORMED BY OVERLAPPING THE REINFORCEMENT ORIENTATION AND THE TIME-FREQUENCY DIMENSIONS. MEASUREMENTS OF LEARNING PERFORMANCE AND LEVEL OF ASPIRATION BEHAVIOR WERE MADE. THE REINFORCEMENT VARIABLES DID NOT CONSISTENTLY AFFECT LEARNING PERFORMANCE OR ASPIRATION EITHER SINGLY OR IN COMBINATION WITH ALL OTHER VARIABLES. NEITHER DID THE VARIABLES OF SEX OR PLACEMENT TYPE (INSTITUTIONALIZED AND NONINSTITUTIONALIZED STUDENTS), SINGLY OR IN COMBINATION, HAVE A CONSISTENT EFFECT. ONLY THE LEVEL OF COMPLEXITY VARIABLE, SINGLY AND TO SOME EXTENT IN COMBINATION WITH THE VERBALIZATION VARIABLE, HAD AN EFFECT ON LEARNING PERFORMANCE. EVEN THIS, HOWEVER, HAD NO EFFECT ON ASPIRATION LEVEL. (JH)

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Systematic Variation of Certain Conditions Related to Learning in the Mentally Retarded: Reinforcement

Cooperative Research Project No. 862

Kathryn A. Blake, E. T. Donlon, L. A. Zeigler, and M. J. Trippe

with the cooperation of

Charlotte L. Williams

Rebecca S. Dover

I. L. Cannon

and others

Syracuse University and The University of Georgia

1961

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SYSTEMATIC VARIATION OF CERTAIN CONDITIONS RELATED TO LEARNING IN THE MENTALLY RETARDED: REINFORCEMENT

Cooperative Research Project No. 862

Kathryn A. Blake, E. T. Donlon, L. A. Fleigler, and M. J. Trippe
with the cooperation of
Charlotte L. Williams
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J. L. Carmon
and others

Syracuse University Research Institute, Office of Research in
Special Education and Rehabilitation, Syracuse, New York
and the
Office of General Research, University of Georgia, Athens, Georgia
1961

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PREFACE

This final report is being submitted in fulfillment of the contract for CRP #862, Systematic Variation of Certain Conditions Related to Learning in the Mentally Retarded: Reinforcement. CRP #862 was an extension of CRP #469, Studies of the Effects of Systematic Variations of Certain Conditions Related to Learning. I. Conditions of Reinforcement. Both projects were supported through the Cooperative Research Program of the Office of Education, U. S. Department of Health, Education, and Welfare.

Essentially, the manuscript contains a description of elements common to both projects and an analysis and interpretation of data collected in the two projects and combined for the purposes of this report. The necessary work was performed by personnel at Syracuse University in Syracuse, New York, and the University of Georgia in Athens, Georgia. Personnel based at Syracuse University collected data in the north central New York region by repeating the procedures used in CRP #469 with a group of institutionalized intellectually retarded subjects who came from the same general geographical areas as the non-institutionalized subjects in the original investigation. Personnel based at the University of Georgia organized and combined the data collected in CRP #469 and the data collected in CRP #862, analyzed these combined data, and prepared the final report.

Louis A. Fleigler served as project director while the field work on CRP #862 was being initiated. Matthew J. Trippe, now at George Peabody College for Teachers, became project director after Dr. Fleigler transferred from Syracuse University to the University of Denver. Edward T. Donlon was project manager for the many activities required in preparing materials, selecting subjects, and collecting data. Kathryn Blake wrote the prospectus for the project, served as consultant during the field work, supervised the organization and treatment of the data, and directed the final report preparation.

Such a large and complex project as this involves the participation of many people. To acknowledge those whose cooperation and assistance contributed so much to the research is indeed a pleasure. Sincere appreciation is extended to the people named below.

Mrs. Charlotte Williams served as project manager for coordinating all of the work involved in organizing and treating the data and preparing the final report. Mrs. Rebecca Dover supervised the clerical procedures required for final report preparation. Dr. James L. Carmon, Head of the Department of Experimental Statistics at the University of Georgia, supervised the machine processing of the data; he also gave advice about the encoding and decoding of the statistical material and the techniques employed in the supplementary statistical analyses. The long hours of intricate and tedious work which these people performed so graciously under difficult conditions caused by extreme time pressures greatly expedited completion of the final report.

Time for the senior author to devote to this project was allocated by the following administrators at the University of Georgia: Dr. Joseph A. Williams, Dean, College of Education; Dr. Stanley H. Ainsworth, Chairman, Program for Exceptional Children; and Dr. Robert A. McRorie, Director, Office of General Research. Further, they kindly made additional work load adjustments during the period in which the time required for project work exceeded that allocated.

As stated previously, this project involved combining data obtained in two investigations. Therefore, in addition to acknowledging personnel who worked on CRP #862, citing people who contributed to certain facets of CRP #469 is appropriate here.

Pilot testing in the original investigation and intelligence testing and task administration in both investigations required a large number of subject contacts in public day schools and public residential schools throughout the north central New York area. Listed in Appendix A are the names of personnel from these agencies who granted permission for the research to be conducted with children and adolescents under their jurisdiction and who directly assisted by making arrangements for testing facilities and subject scheduling.

Responsibilities assumed by research personnel in CRP #469 were the following. Dr. Donlon arranged for and scheduled the investigator-subject sessions and organized the subjects' records. Dr. Donlon, Dr. James D. Beaber, Mrs. Eva K. Woolfolk, Mr. William C. Arranga, and Mr. Leonard W. Becker administered intelligence tests. Dr. Andrew L. Shotick and Mr. Isadore Turansky developed and pilot tested the experimental tasks. During the final phase of the original study, experimental tasks were administered by Dr. Donlon, Dr. Beaber, Mrs. Woolfolk, Dr. Shotick, Mr. Turansky and by Mrs. Ellen W. Heizman, Dr. E. Donald Blodgett, Mrs. Virginia R. Hickernell, Mr. Eric F. Theiner, and Mr. Lawrence H. Weiner.

Mr. Theodore Lashley and Mr. Edward Brower administered intelligence tests and experimental tasks to the subjects in CRP #862.

The IBM cards containing the data for the subjects in CRP #469 were prepared by members of the staff of the Syracuse University Computer Center under the general supervision of Dr. Bruce Gilchrist and Dr. Werner G. Rheinbolt and under the specific direction of Mr. Richard D. Wilkins. Mrs. Virginia M. Sheehan and Miss Phyllis F. Gorlick performed the key punch operations.

The machine processing of the combined data for the original investigation and the extension was conducted by personnel of the Department of Experimental Statistics of the University of Georgia. Mr. James C. Fortson performed the computer operations; he was assisted by Mr. Lamar Kitchens. Key punch operators who produced IBM cards for the subjects in the CRP #862 were Mrs. Reba Chambers and Mrs. Miriam Thompson.

Encoding and decoding data before and after IBM treatment and performing the supplementary statistical analyses involved the following people: Mr. F. Niles Dover, Mr. William R. Center, Mr. Douglas L. Gatchell, Mr. Michael V. Horton, Mr. George M. Olshin, Mrs. Elizabeth W. Newman, Mr. Robert S. Williams, and Mrs. Mary H. Winiarski. Mr. Dover was given the leadership in this phase of the work.

Miss Setsuko Koga translated research reports published in Japanese. Mrs. Norma Galbreath, Miss Lare Harden, and Mr. Jerry Wall assisted with the typing.

Mrs. Jacqueline Tucker and Mrs. Carolyn Nunnally proofread the materials. Mr. Williams also helped with the proofreading. Mrs. Tucker, Mrs. Nunnally, and Mr. Williams specifically were assigned to identify typographical errors and inconsistencies in format.

Miss Helen Westbrook edited the manuscript. Miss Westbrook's role was to increase the grammatical accuracy of the material and the clarity and precision with which it was finally presented.

While those who are named in this prefactory statement made valuable contributions to the improvement and the completion of the project, the senior author alone bears the entire and final responsibility for any errors and inadequacies in planning, execution, interpretation, and reporting.

K.B.

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CHAPTER I

PROBLEM

Introduction

The investigation reported herein was an extension of the investigation, Studies of the Effects of Systematic Variations of Certain Conditions Related to Learning. I. Conditions of Reinforcement (Blake, 1959). This extension involved several facets: repeating the procedures of the original investigation with a group of intellectually retarded subjects who were placed in 24-hour residential situations and who attended school within the institutions; combining data obtained in the original investigation and data obtained with the institutionalized subjects; analyzing these combined data; and, writing a new final report. Much of the final report of the original investigation pertains to the present report; consequently, some aspects of this original report are repeated exactly, and some are paraphrased and expanded to include material specific to the added subject variable, placement type--institutional and non-institutional.

Purpose and Objectives

The purpose of this investigation was to study the effects and interaction effects of selected reinforcement, task, and subject variables on learning performance and level of aspiration behavior. The reinforcement variables included reinforcement type-frequency and reinforcement orientation administered within the framework of the level of aspiration technique. The task variables were level of complexity and extent of overt verbalization involved in the task activities. The subject variables encompassed intelligence level, chronological age, sex, and placement type. The specific objectives were to examine each of the following.

1. Effects of the reinforcement variables on (a) learning performance and (b) level of aspiration behavior.

2. Effects of the subject variables on (a) learning performance and (b) level of aspiration behavior.

3. Interaction effect of the reinforcement variables on (a) learning performance and (b) level of aspiration behavior.

4. Interaction effects of the subject variables on (a) learning performance and (b) level of aspiration behavior.

5. Interaction effects of the reinforcement and subject variables on (a) learning performance and (b) level of aspiration behavior.

6. Interaction effects of the reinforcement and task variables on (a) learning performance and (b) level of aspiration behavior.

7. Interaction effects of the subject and task variables on (a) learning performance and (b) level of aspiration behavior.

Educational Significance

This investigation is a part of a multiple phase research program. The nature and educational significance of the research program were discussed in the final report of another study in the program (Blake, 1961). This discussion, which is equally germane to the present study, is reiterated below.

> Gardner and his associates (1958, 1961), who wrote the panel report on The Pursuit of Excellence: Education and the Future of America, succinctly stated a major educational goal. "But though the educational patterns (for individuals who have different capacities) may differ, the goals remain much the same for all: enabling each young person to go as far as his aptitude will permit in fundamental knowledge and skills and motivating him to continue his self-development to the full along similar lines" (p. 32, p. 373).
>
> Accomplishing this goal is a primary concern of those who seek to achieve excellence through an educational framework designed to foster in each student the ability to use his talents in the process of satisfying his own personal needs and contributing to the society of which he is a member. A problem is posed, however, by evidence that this goal is not being attained to a desired extent (Cruickshank, 1946, 1956; Dunn, 1954; Monroe, 1948; Fleigler and Bish, 1959; Gardner, 1961). Sarason and his associates (1960) portray the generality of this problem in the following comments. "(The concern is) with an extremely broad and important problem: the relationships and discrepancies between performance and potential. It is no exaggeration to say that the relationship between what man does and what he is capable of has always concerned the thinker and scholar regardless of his field. This is not surprising when one considers that these relationships touch upon the even more general problem of the nature of man" (p. 1).
>
> This is an especially crucial issue for educators and solutions are contingent upon examining some of the problem's bases. Such an examination involves studying a number of facets of the educational process. One important facet is conditions related to learning. To explore this facet in some depth, the present investigator undertook

the research program of which the study reported herein is one phase.

This research program may be described briefly in terms of problem, orientation, and content. The overall problem for the research program involves studying how systematically varying certain conditions related to learning affects, and interacts to affect, learning performance. The research program's general orientation is that basic information about this problem is significant for the field of education in this sense: a number of educational (methodological and curricular) decisions are predicated, to a great extent, upon the manner in which individuals learn; consequently, making the most efficient decisions in these cases is facilitated by knowledge about how the individuals in question respond to conditions of which learning is a function. The research program's content is exemplified in a statement by Jordan (1961); in this statement, he captures the essence of more complex, but pertinent, behavior models: "The consideration of any learning problem might be schematized as some interaction of (1) learner variables, (2) task variables, and (3) method variables" (p.109). Each study in the research program includes all three of these elements; the nature of the elements and the extent to which they are considered differ, to some extent, from study to study.

The first investigation in the research program was Studies of the Effects of Systematic Variations of Certain Conditions Related to Learning. I. Conditions of Reinforcement (Blake, 1959). Essentially, a study was made of the effects and interaction effects of certain reinforcement, task, and subject variables on learning performance and level of aspiration behavior. The specific antecedent variables involved were the following: reinforcement variables--type, frequency, orientation, and point of introduction of reinforcement; task variables--level of complexity and extent of overt verbalization involved in the task activities; and subject variables--intelligence level and chronological age with mental age held constant. As stated previously, an extension of this first investigation is the subject of the present report.

The second investigation in the research program was Studies of the Effects of Systematic Variations of Certain Conditions Related to Learning. II. Conditions of Practice (Blake, 1961). Essentially, a study was made of the effects and interaction effects of certain practice, subject, and task variables on learning performance. The specific antecedent variables involved were the following: practice variables--type of recitation, distribution of practice, and amount of material (whole-part approaches); subject variables--intelligence level, chronological age, mental age, and sex; and task variable--extent of a logical relationship existent among task materials.

The third investigation in the research program is _Studies of the Effects of Systematic Variations of Certain Conditions Related to Learning. III. Task Conditions_ (Blake, 1964). This study is now in progress. Essentially, it involves the effects and interaction effects of certain task and subject variables. The specific antecedent variables involved are the following: task variables--level of complexity of the task activities, level of abstractness of the task materials, type of presentation of the task materials, and type of approach to task solution; and subject variables--intelligence level, chronological age, mental age, and sex.

Related Research

Research considered pertinent to the problem as defined encompassed studies in which individuals below college age[1] were used in investigating the effects and interaction effects of reinforcement, task, and subject variables on intellectual performance and motivation. Such research is cited briefly[2] in this section.

Several investigators were concerned with how reinforcement variables, singly and in combination with task and subject variables, affected subjects' behavior. Types of incentive-reinforcement studied were material reward, praise and reproof, competition, success and failure, and goal setting. Subject variables considered were chronological age, sex, intelligence level, academic achievement, and personality adjustment. Behavioral aspects investigated as dependent variables were learning and task performance, level of aspiration behavior, persistence, and perception of task attractiveness.

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[1] It is recognized that the separation of studies in which children and adolescents were employed as subjects from those in which adults and infrahuman subjects were used is an artificial one. Many generalizations pertinent to the chosen topics emanating from these latter studies may be applicable to the behavior of children; nevertheless, space limitations preclude treatment of these investigations herein. Extensive reviews of the omitted research have been published (Frank, 1941; Jenkins and Stanley, 1950; Lazarus, Deese, and Osler, 1952; Lewin, Dembo, Festinger, and Sears, 1944; McGeoch and Irion, 1952; McPherson, 1948; Murphy, Murphy, and Newcomb, 1937; Postman, 1947; Sherif and Cantril, 1947; and Woodworth and Schlossberg, 1954).

[2] A more extensive and detailed presentation of previous research related to the reinforcement and subject variables (except institutionalization) appeared in the report of the original _Conditions of Reinforcement_ investigation (Blake, 1959).

Some investigators reported that control subjects and subjects receiving reinforcement variants did not differ; other investigators reported that control subjects performed less adequately on various tasks than did subjects who were administered material reward, praise and reproof, competition sets, and level of aspiration sets. Representative studies listed by type of reinforcement and investigator are the following: material reward--Abel (1936), Forlano (1936), Thorndike (1935), and Thorndike and Forlano (1933); praise and reproof--Anderson (1936), Anderson and Smith (1933), Benton (1936), Brenner (1934), Chase (1932), Forlano and Axelrod (1937), Gilchrist (1916), Grace (1948), Hurlock (1924; 1925), Schmidt (1941), and Thompson and Hunnicutt (1944); competition sets--Brown (1932), Chapman and Feder (1917), deWeerdt (1927), Hurlock (1927), Kirby (1913), Lueba (1933), Maller (1929), Maller and Zubin (1932), Panlasigui and Knight (1930), Symonds and Chase (1929), Triplett (1898), and Zubin (1932); level of aspiration sets--Anderson and Brandt (1939).

Results relevant to how success and failure information influenced perception of task attractiveness and persistence were fairly conclusive in indicating that a differential effect occurred (Filler, 1952; Grosslight and Child, 1947; Rosenzweig, 1933; Sanford, 1946; and Uematsu, 1956). Such conclusiveness is not apparent in information pertaining to how success and failure information affected task performance (Fitzgerald, 1951; Gaundine-Staunton, 1938; Goodenough and Brian, 1929; Hutt, 1947; Schmidt, 1941; Sullivan, 1927; and Taylor and Farber, 1948); this inconclusiveness also is the case for level of aspiration behavior (Grosslight and Child, 1947; Jucknat, 1937; and Shaw and Bensberg, 1955).

Investigations of the role of subject and situational variables as determinants of response to reinforcement yielded rather conclusive evidence that chronological age, sex, and investigator differences were not consistently significant influences within the populations studied (Adams, 1939; Hurlock, 1924; Jucknat, 1937; Rosenzweig, 1933; Schmidt, 1941; and Walter and Marzolf, 1951). On the other hand, results relevant to the effects of personality or intellectual tasks and experiential variables are contradictory (Abel, 1936; Filler, 1952; Forlano and Axelrod, 1937; Grace, 1948; Gruen, 1945-1946; Hurlock, 1924; Hutt, 1947; Jucknat, 1937; Little and Cohen, 1950-1951; Rosenzweig, 1933; Sears, 1940; Sears, 1941; Sherman and Bell, 1951; Sullivan, 1927; Taylor and Farber, 1948; Thompson and Hunnicutt, 1944; Uematsu, 1956; and Walter and Marzolf, 1951).

Only in relation to material reward were attempts made to assess the consequences of varying the amount of the reinforcement or the time in the performance sequence at which the reinforcement was introduced (Abel, 1936; Thorndike, 1935; and Thorndike and Forlano, 1933). Nevertheless, discrepancies in results were present.

Very little attention was centered specifically either on how immediate, explicit success and failure information affected children's goal discrepancy scores or on the role of subject variables in this effect. Probably most pertinent are aspects of work by Anderson and Brandt (1939), Grosslight and Child (1947), Jucknat (1937), Little and Cohen (1950-1951), Sears (1940; 1941), and Shaw and Bensberg (1955). Yet, implications of the relevant results are rather unclear. This paucity of previous data is also the case when the roles of group standards and competition in the sizes of children's goal discrepancy scores are examined.

Similarly, there is some, but not enough, evidence about how reinforcement variables affect changes in goals. Jucknat (1937) presented evidence about the role of various degrees of success and failure in direction of goal change. Although some subjects kept the same goals, most subjects tended to raise their goals after success and to lower them after failure. The frequency of these goal changes was positively related to degree of success and failure. Further, Anderson and Brandt (1939) demonstrated that competition sets affected directions of goal changes: when subjects were told the goals their reference groups held, they tended to alter their own goals in the directions of the reported group goals.

Research pertinent to how subject and task variables (reinforcement variables held constant) affect level of aspiration behavior includes studies related to the role of variations in current and long term status in academic achievement and to the role of differences in intelligence level. This research is scarce and contradictory. Generally, the work of Shaw and Bensberg (1955), Uematsu (1956), and Walter and Marzolf (1951) indicated a null relationship between sizes of goal discrepancy scores and intelligence test and/or achievement test scores. On the other hand, Sears (1940) extensively discussed differences in the goal discrepancy scores of subjects who were selected to vary in terms of previous success and failure experiences related to school activities.

Another group of investigators examined the effect of subject variables on intellectual performance when reinforcement variables ostensibly were held constant. The research model here included varying chronological age and intelligence level and holding mental age constant. Dependent variables were psychometric test performance, academic achievement test performance, and tasks which involved more immediate learning.

A number of investigators reported that subjects who were similar in mental age and dissimilar in intelligence level and chronological age level showed both similarities and differences in performance on various educational achievement tests and psychometric tests; the nature and direction of these differences were related, to some extent, to the type of task (Bolles, 1937; Chapman and Dale, 1922; Cruickshank, 1946; Cunningham, 1934; Davidson, 1931; Doll, 1917-1918; Doll, Phelps, and Melcher, 1932; Dunn, 1954; Fox, 1927; Jones, 1919-1920; Magaret and Thompson, 1950; Martinson and Strauss, 1941-1942; McFaddin, 1937; Merrill, 1924; Murdoch, 1918; Taylor, 1932; Thompson and Magaret, 1947; and Wallin, 1929).

Information implicitly relevant to whether concomitant similarities and differences would be evident in performance on related tasks involving more immediate learning was presented by Cassell (1957), Colvin (1915), Johnson and Blake (1960), Stevenson and Isco (1954), and Woodrow (1917). That is, in some of this work, there was reason to expect that retarded and normal subjects would show both similarities and differences in performance and that these would be a function of the type of task and the aspect of performance being investigated. However, the results germane to this expectation were equivocal. In some aspects of learning the expected differences occurred; in other aspects, they did not.

In a different, but related, line of inquiry, attention was focused on how the subject variable, institutional and non-institutional placement type, affected behavior. About this topic Sarason and Gladwin (1961) commented: " . . . the institutional setting seldom provides conditions of learning which are calculated to increase adequacy of response" (p. 107). As this statement implies, it generally is accepted that institutionalized and non-institutionalized intellectually retarded subjects differ in their responses to intellectual tasks and in their motivational characteristics. However, no direct data relevant to this matter were located in an extensive survey of the literature. Rather, the generalization seems to be based on research and on more informal observation usually involving young children or children institutionalized at an early age. Such research and observation were focused on how institutionalization and, often implicitly, cultural and psychological deprivation influenced such functions as personality, intelligence test performance, and language facility.[1] The obtained information pertained to the following factors among others: reason for original institutionalization of the child (lack of adequate home care, lack of community facilities to care for the child, recalcitrant behavior, etc.); relatively low adult-child interaction in an institutional framework which was considered to have implications for satisfying emotional and physical contact and stimulation, reward for responses, and orientation toward achievement; and, the child's anxiety in the assessment situation about his future disposition or placement. The assumption seems to be that these factors result in a climate which is detrimental to efficient learning and realistic motivational characteristics. This may be the case. It is logical. However, there is a need for direct investigation of this matter. Sarason and Gladwin (1961) discussed the problem extensively. They apparently maintained that while institutionalized and non-institutionalized subjects do not differ basically, there are reasons why they may appear to differ. Presented below are several of their comments.[2] These comments illustrate the problem's nature and complexity and its need for further exploration.

> ... the bulk of the "high grade" cases in our institutional population differs in no fundamental respect from those we have called mentally retarded.[3] Parental neglect or abuse which comes to the attention of authorities, delinquent behavior, aggressive display in the school situation, lack of adequate community facilities (e.g., foster care, temporary shelters)--these are frequently the

---

[1] Among the many citations bearing on this general problem are the following: Badt (1958-1959), Bakwin (1942), Bender and Yarnell (1941), Bowlby, Ainsworth, Boston, and Rosenbluth (1956), Chapin (1915), Chipman (1946), Clarke and Clarke (1954), Cutts and Lane (1947), Farrell (1956), Gesell and Armatruda (1941), Goldfarb (1943a; 1943b; 1944; 1945a; 1945b; 1947), Goldfarb and Klopfer (1944), Lipman and Griffeth (1960), Marcotte (1947), McCandless (1952), Moore (1947), Papania (1955), Rheingold (1956), Ribble (1944), Schlanger (1953), Schlanger and Gottsleben (1957), Skeels and Dye (1939), Skeels and Fillmore (1937), Skeels, Updegraff, Wellman, and Williams (1938), Spitz (1945; 1946), Wellman and McCandless (1946), Williams and McFarland (1937).

[2] In the material cited, all italics and quotations are Sarason's and Gladwin's.

[3] Label for ". . . that large group of individuals whose retardation is not associated with organic pathology and who are able, or could become able, to maintain themselves in the community" (Sarason and Gladwin, 1961, p. 625).

> factors which determine whether or not a retarded child is likely to be institutionalized (p. 626).
>
> In an earlier paragraph we expressed the opinion that the bulk of the high grade cases in our institutions differed in no fundamental respect from those we have called mentally retarded but are not institutionalized. One could argue against such a conclusion on the grounds that the test scores of those institutionalized are probably significantly lower than the scores of those who are in the community and that such a difference may reflect a "basic" difference between the two groups. From all that we have said thus far in this report, it should be apparent that we do not think the grounds for such an argument are tenable. However, it should be noted that we do not have any systematic studies on this problem (p. 628).
>
> From the standpoint of our society one of the most neglected research areas concerns the psychological changes which are associated with institutionalization. When one realizes how many millions of dollars are spent in building and maintaining our institutions, it is surprising that very little research has been done to study the psychological changes which institutionalization brings about. Institutionalization involves drastic change for the individual and there is every reason for assuming that it is a stressful one involving (a) separation from loved or familiar figures, (b) pressures to adjust to a complete new physical and interpersonal (peer and adult) environment, (c) confusion and resentment about their helplessness, and (d) anxiety in relation to the future. In the case of the mentally retarded individual, who usually comes from an unfavorable family situation, we are usually struck by the material differences between home and institution. But this is the way we view the change and one should not assume, therefore, that the child perceives it the way we do. What to us is a psychologically unfavorable family situation, and what may even be an unpleasant one to the child, may in the process of institutionalization be perceived by the child as his only source of security. As important as the immediate effects are those of prolonged institutionalization. It is our clinical impression that the major effects of prolonged institutionalization are four-fold: (a) overt conformity to the institutional culture at the expense of personal spontaneity and expression, (b) excessive phantasying, especially about the "outside world", (c) avoidance of and fear of new problem solving situations, and (d) excessive dependence on the institutional culture, which becomes apparent when the possibility of leaving the institution arises. The effects of institutionalization vary with age at commitment. In stressing the possible deleterious effects of institutionalization we are not unmindful that we are dealing with a very complex problem (pp. 626-627).

To this point, the present section has included a brief citation of research designated as being pertinent to the problem defined for this investigation. Consideration of this related research reveals that the investigations of the effects of reinforcement, subject, and task variables have contributed to a body of knowledge about factors influential in the learning and motivational behavior of children. Yet, many questions remain about the data referred to above and about the implications of these data. Some of these questions pertain to the following issues: the effect of dimensionalizing more extensively and precisely the reinforcement variables; the possible interaction of several reinforcement variables; the relative effect of reinforcement variants when control subjects are given knowledge of results and when the reinforcement is administered to subjects individually rather than within a group; the relative effect of reinforcement variants on responses of subjects who have similar mental ages but different intelligence levels, chronological ages, and experiential backgrounds; the effect of presenting the reinforcement information within the framework of different social orientations; the relative influence of reinforcement variants when requirements for successful performance on a task differ; the role in learning performance of subject and task variables when each type of variable is dimensionalized extensively; and the influence of institutionalization on motivational and intellectual behavior. Studies located in the extensive search through the literature either did not pertain to, or did not contain conclusive evidence about, such questions. These questions represent a concern of the present study.

CHAPTER II

PROCEDURE

Experimental Design

The intent in this investigation was to study the effects and interaction effects on learning performance and level of aspiration behavior of selected reinforcement, subject, and task variables. The experimental design considered appropriate for this purpose is illustrated in Figure 1 and is summarized below in terms of its structure and methodology.

The major structural components of the design--the subject, reinforcement, and task variables--consisted of several variants. The subject variables were IQ, CA, sex, and placement type; MA was held constant. The reinforcement variables encompassed type, frequency, and orientation of success and failure information. Reinforcement type-frequency[1] included 100% success, 66% success--33% failure, 33% success--66% failure, and 100% failure. Reinforcement orientation involved an individual orientation and a group orientation. Controls were the level of aspiration control in which the subjects set goals and received only performance information, and the speed and accuracy control in which the subjects received only performance information. The overlap of the two reinforcement variables formed 12 combinations: 100% success, individual orientation; 100% success, group orientation; 66% success--33% failure, individual orientation; etc. The task variables were level of complexity and extent of overt verbalization involved in task activities. The level of task complexity variants included discrimination learning, rote learning, and concept formation; the extent of overt task verbalization variants, verbal and non-verbal. The overlap of the task variables resulted in six tasks: the discrimination learning verbal, the discrimination learning non-verbal, the rote learning

---

[1] A 1/3 to 2/3 ratio was used to establish the type-frequency variants. When percentages were used to refer to these variants, the fractions or decimals were omitted because it was more convenient to do so; however, it is implicit that the respective percentages should be considered as 33 1/3% and 66 2/3%.

Figure 1-Experimental Design[a]

Subject Variables	(B) Levels (Chronological Age--Intelligence Level)/Placement Type		B1, Non-institutionalized Retarded; B2, Normal; B3, Superior; B4, Institutionalized Retarded					
Task Variables	Extent of Verbalization		Verbal			Non-Verbal		
	Level of Complexity[b]		DL	RL	CF	DL	RL	CF
Reinforcement Variables (C) Reinforcement Type-Frequency/ (D) Reinforcement Orientation	(C1) 100% Success	(D1) Individual (D2) Group	1 7	10 3	2 11	9 4	6 12	8 5
	(C2) 66% Success--33% Failure	(D1) Individual (D2) Group	2 8	7 5	6 10	11 1	4 9	12 3
	(C3) 33% Success--66% Failure	(D1) Individual (D2) Group	3 9	8 6	1 12	10 2	5 7	11 4
	(C4) 100% Failure	(D1 Individual (D2) Group	4 10	9 1	3 8	12 5	2 11	7 6
	(C5) Level of Aspiration Control	(D1) Individual (D2) Group	5 11	12 2	4 7	8 6	3 10	9 1
	(C6) Speed and Accuracy Control	(D1) Individual (D2) Group	6 12	11 4	5 9	7 3	1 8	10 2

[a] The numbers within the cells refer to subgroups which were designated base cell groups. The arrangement of these numbers within the figure reflects the reinforcement combinations under which the subjects in the base cell groups received the several tasks. Also, throughout the report, the alphanumeric combinations cited within the figure are used in referring to the several major levels groups and treatments, both singly and in combination.

[b] DL, RL, and CF are abbreviations for discrimination learning, rote learning, and concept formation,

verbal, the rote learning non-verbal, the concept formation verbal, and the concept formation non-verbal tasks. The four practice levels corresponded to four segments of trial sequences for each task.

The methodology used in manipulating the design components or variables is cited briefly below. What were termed major levels groups were selected in the following manner. Three major groups of subjects who differed in terms of intelligence level--retarded, normal, and superior--were identified in the special and the regular classes of the public schools; these subjects were chosen in such a way that MA was constant and CA varied. An additional major group of subjects who had intelligence quotients at the retarded level were selected from institutions for the intellectually retarded. The two retarded groups were selected to be similar in IQ, MA, and CA and different in placement type, institutional and non-institutional. No attempt was made to control sex frequencies by selection.

What were termed base cell groups were established in this way. The overlapping of the reinforcement orientation and type-frequency variables formed 12 cells, designated base cells. The subjects in each major levels group were assigned randomly to the 12 cells, thus forming 12 base cell groups of subjects; these combined to make 48 base cell groups for the entire design.

The subjects in the several levels groups were administered the six tasks individually in conjunction with the 12 combinations of the two reinforcement variables. These reinforcement variables were administered within the framework of the level of aspiration technique. The particular combination of reinforcement variants a subject received was determined by the base cell group to which he was assigned. Subjects in each base cell group were administered all six tasks; the combination of variants which a base cell group received was changed from task to task.

Throughout any one task administration, all subjects were given directions for speed and accuracy. The reinforcement information was administered to the type-frequency--orientation groups in three phases: a control phase in which the subjects received only performance information, a differential phase in which the subjects set goals and received the several frequencies of success or failure information within the individual or group orientation, and a terminal phase in which the subjects set goals and received 100% success information within the individual or group orientation.

The level of aspiration control subjects received the control phase and they set goals and received performance information during the latter two phases. The speed and accuracy control subjects operated under the conditions of the control phase throughout a task.

In the subsequent sections of this chapter, these structural and methodological aspects of the experimental design are described in detail.

Subjects

The subject variables were CA, IQ, sex, and placement type. One aspect of the study's purpose was to examine whether these subject variables singly or in combination with the reinforcement variables affect learning performance and level of aspiration behavior. Accomplishing this involved selecting four major levels groups of subjects and then subdividing each group into 12 subgroups. The considerations involved in subject selection are recounted in the following sections; these include definitions of terms, sampling criteria, sampling procedure, descriptive statistics relevant to the subject variables, and inferential statistics relevant to the subject variables.

Definitions of Terms

For the purposes of this investigation, the following definitions of terms were employed in reference to the subjects.

1. *Mental age*. Index reflecting the total number of items the subject successfully completes on the Form L of the Stanford-Binet Test of Intelligence, 1937 Revision (Terman and Merrill, 1937).

2. *Chronological age*. Age determined by subtracting the subject's birth date from a specified date prior to the initiation of task administration.

3. *Intelligence quotient*. Index based on the relationship between the subject's CA and the MA he attains on the Form L of the Stanford-Binet Test of Intelligence, 1937 Revision; derived by consulting the data presented in the Terman-Merrill tables (Terman and Merrill, 1937).

4. *Placement type*. Location of residence and school attendance.

   a. *Non-institutional placement*. Residence in a community and attendance at a public day school.

   b. *Institutional placement*. Residence and school attendance in an institution for the mentally retarded.

5. Intellectually retarded subjects. Subjects whose IQ's are within the limits of 50 to 75.

6. Intellectually normal subjects. Subjects whose IQ's are within the limits of 90 to 110.

7. Intellectually superior subjects. Subjects whose IQ's are 120 or higher.

Sampling Criteria

Retarded, normal, and superior Caucasian pupils who satisfied the following criteria were selected for possible inclusion in the study.

1. Mental ages within the limits of 8 years 0 months to 11 years 6 months.

2. Placement in the following school situations: public school regular classes--normal and superior subjects; public school special classes--non-institutionalized retarded subjects; institutional classes--institutionalized retarded subjects.

3. Absence--as judged by the classroom teachers, the principals, the visiting teachers, the school psychologists, and/or the investigators--of major emotional disturbances which could be detrimental to task performance.

4. Absence of minor, uncorrected physical or sensory limitations which could interfere with task performance and absence of gross physical or sensory limitations.

5. For institutionalized retarded subjects, institutional placement for no less than one year. For non-institutionalized retarded subjects, no history of institutional placement.

Sampling Procedure

The superior, normal, and non-institutionalized retarded subjects were chosen during the autumn of 1958; the institutionalized retarded subjects, during the autumn of 1960. These subjects were enrolled in 23 public schools and two institutions for the mentally retarded located within a 50 to 75 mile radius of Syracuse, New York. The following selection procedure was used for all groups. School records, including the results of previous psychometric and academic achievement tests, were examined; and conferences were held with principals, classroom teachers, visiting teachers, and/or school psychologists. The information thus obtained was used to establish for each group lists of individuals whose characteristics tentatively were consistent with the sampling criteria. These prospective subjects were administered the Form L of the Stanford-Binet Test of Intelligence, 1937 Revision. The superior, normal, and non-institutionalized retarded individuals' CA's and MA's were prorated in terms of the date December 31, 1958; the institutional retarded individuals, December 31, 1960.

The individuals who satisfied all sampling criteria were selected as subjects. To prevent any type of grouping of subjects by schools was desirable; and so, within each of the four major levels groups, subjects from the several schools or institutions were pooled and listed in an irregular order. The subjects in the resulting lists were assigned numbers from one to the total number in the group. The procedures for randomization and the table of random numbers presented by Edwards (1950) were employed in assigning subjects within the four major levels groups to the respective sets of 12 subgroups required by the experimental design. Eight subjects were assigned to each subgroup thus involving 96 subjects in each major levels group; the remaining subjects tentatively selected for the major levels groups were used as substitutes when attrition occurred.

Descriptive Statistics Relevant to the Subject Variables

The subject data are listed in Appendix B according to base cell groups within major levels groups. These major levels groups consist of the original subjects; they do not contain the few substitutes made when attrition occurred. The subject data include each subject's identifying code number, school code number, MA, CA, IQ, and sex.

Tables 1, 2, 3, and 4 contain descriptive statistics reflecting the MA, CA, and IQ characteristics of and the sex distributions in the base cell groups listed by major levels groups. Table 1 includes data relevant to MA; Table 2, to CA; Table 3, to IQ, Table 4, to sex.

Two comments about mechanics of presentation are apropos here. First, the tables contain only numbers rounded by conventional procedures; unrounded numbers were employed in the statistical analyses. Second, means are presented only for the base cell groups. These all involved untransformed scores. Since means are additive, the reader may compute any means for levels, treatments, etc. in which he has a special interest.

Table 1

Mental Ages (Months) of Subjects Classified According to Base Cell Groups Within Major Levels Groups

Major Levels Group	Statistic	Base Cell Group					
B1	Base Cell #	1	2	3	4	5	6
	$\bar{X}$	119	117	117	118	113	114
	s	12	7	11	10	11	9
	Base Cell #	7	8	9	10	11	12
	$\bar{X}$	118	116	117	117	116	116
	s	11	9	10	10	11	9
B2	Base Cell #	1	2	3	4	5	6
	$\bar{X}$	117	119	117	117	117	117
	s	12	13	11	11	10	12
	Base Cell #	7	8	9	10	11	12
	$\bar{X}$	117	115	117	117	117	117
	s	10	9	15	15	6	13
B3	Base Cell #	1	2	3	4	5	6
	$\bar{X}$	126	127	126	126	128	126
	s	10	11	8	8	11	10
	Base Cell #	7	8	9	10	11	12
	$\bar{X}$	127	128	127	126	126	127
	s	10	8	9	13	11	6
B4	Base Cell #	1	2	3	4	5	6
	$\bar{X}$	117	116	115	115	117	115
	s	11	12	14	12	12	11
	Base Cell #	7	8	9	10	11	12
	$\bar{X}$	114	115	114	115	116	115
	s	13	12	8	11	13	16

Table 2

Chronological Ages (Months) of Subjects Classified According to Base Cell Groups Within Major Levels Groups

Major Levels Group	Statistic	Base Cell Group					
B1	Base Cell #	1	2	3	4	5	6
	$\bar{X}$	180	177	177	172	173	167
	S	14	17	13	17	12	14
	Base Cell #	7	8	9	10	11	12
	$\bar{X}$	185	171	173	174	176	172
	S	21	12	17	17	11	13
B2	Base Cell #	1	2	3	4	5	6
	$\bar{X}$	113	112	117	109	112	111
	S	5	9	10	10	11	9
	Base Cell #	7	8	9	10	11	12
	$\bar{X}$	120	115	117	114	118	115
	S	9	11	11	11	8	9
B3	Base Cell #	1	2	3	4	5	6
	$\bar{X}$	100	100	100	96	101	99
	S	7	7	9	10	10	11
	Base Cell #	7	8	9	10	11	12
	$\bar{X}$	100	102	95	99	95	99
	S	9	10	5	7	8	6
B4	Base Cell #	1	2	3	4	5	6
	$\bar{X}$	187	185	194	182	180	184
	S	11	20	18	14	19	15
	Base Cell #	7	8	9	10	11	12
	$\bar{X}$	185	179	188	187	188	187
	S	10	9	13	18	20	19

Table 3

Intelligence Quotients of Subjects Classified
According to Base Cell Groups Within Major Levels Groups

Major Levels Group	Statistic	Base Cell Group					
B1	Base Cell #	1	2	3	4	5	6
	$\bar{X}$	69	70	69	71	68	70
	s	6	2	6	5	5	3
	Base Cell #	7	8	9	10	11	12
	$\bar{X}$	69	70	71	70	69	70
	s	6	4	4	4	6	5
B2	Base Cell #	1	2	3	4	5	6
	$\bar{X}$	103	106	100	107	104	105
	s	8	5	8	6	5	8
	Base Cell #	7	8	9	10	11	12
	$\bar{X}$	98	101	100	103	99	101
	s	8	7	6	9	6	8
B3	Base Cell #	1	2	3	4	5	6
	$\bar{X}$	127	128	126	133	127	130
	s	5	5	5	10	7	11
	Base Cell #	7	8	9	10	11	12
	$\bar{X}$	128	127	134	129	133	129
	s	6	10	11	12	12	7
B4	Base Cell #	1	2	3	4	5	6
	$\bar{X}$	67	67	65	67	69	67
	s	7	5	6	7	4	6
	Base Cell #	7	8	9	10	11	12
	$\bar{X}$	65	67	65	66	67	66
	s	7	6	5	5	7	8

Table 4

Sex Distribution of Subjects Classified
By Base Cell Groups Within Major Levels Groups

Major Levels Group	B1		B2		B3		B4		Totals by Base Cell Group	
Base Cell Group #	M	F	M	F	M	F	M	F	M	F
1	4	4	2	6	5	3	4	4	15	17
2	6	2	4	4	5	3	4	4	19	13
3	5	3	5	3	5	3	4	4	19	13
4	3	5	4	4	2	6	4	4	13	19
5	3	5	4	4	6	2	3	5	16	16
6	4	4	3	5	4	4	2	6	13	19
7	6	2	5	3	4	4	3	5	18	14
8	5	3	5	3	4	4	6	2	20	12
9	6	2	3	5	4	4	6	2	19	13
10	4	4	5	3	4	4	4	4	17	15
11[a]	2	6	6	2	3	5	7	1	18	14
12	4	4	6	2	4	4	5	3	19	13
Totals by Major Levels Group	52	44	52	44	50	46	52	44	Totals: All Subjects 206	178

[a] B1(M:F) ≠ B4 (M:F)

Inferential Statistics Relevant to the Subject Variables

The relationships among the descriptive statistics presented in the preceding section are portrayed below. After the types of analyses employed are listed, relationships pertaining to each subject variable are delineated.

Analyses

Comparing the subjects in terms of the subject variables involved evaluating relationships among frequencies, within group variances, and means. The statistical techniques used in these evaluations were the following: frequencies--the methods and minimum contrasts listed by

Mainland, Herrera, and Sutcliff (1956); within group variances--Snedecor F-tests of homogeneity of variance; means--3 factor analyses of variance and paired comparisons employing t tests (Edwards, 1950; Lindquist, 1953; and McNemar, 1955).

The .01 probability level was the criterion for rejecting the null hypothesis related to frequencies and means; and the .001 probability level, to within group variances. When the null hypothesis pertaining to within group variances was rejected, it was inferred that extreme heterogeneity was present between the variances within the groups being compared; accordingly, in these cases, when the relationship between the involved groups' means was being evaluated, the criterion for rejecting the null hypothesis was changed to the .001 probability level (Cochran and Cox, 1957; Lindquist, 1953; Weiner, 1962).

Only prime data are reported. The tables contain rounded numbers; unrounded numbers were used in the statistical analyses. The reader may consult the last section of this chapter for a complete specification of details about terminology. Briefly, levels (B) refers to the four intelligence groups; and treatments (C, D) to the two reinforcement variables. Further, the terms relevant to the reinforcement variables used in these subject data analyses refer to the variants administered to the subjects during the first experimental session. For subsequent experimental sessions, the treatment variants which the several groups of subjects received were changed. However, the several relationships among the subject variables were assumed to remain constant.

Mental Age

Presented in Table 5 are the results of the analysis of variance among mean MA's when the subjects were classified according to the levels and the treatments categories, and the several levels by treatment, treatment by treatment, and levels by treatment combinations. A probability level less than .001 was associated with the F-ratio yielded by the comparison of the levels categories (B). The F-ratios yielded by all other comparisons occurred at probability levels greater than .05.

The paired comparisons (Table 6) of the levels groups' means revealed the following relationships: the non-institutionalized retarded group, the normal group, and the institutionalized retarded group had equivalent mean

MA's; the superior group's mean MA was larger than that of each of these groups.

Chronological Age

Table 5 contains the results of the analysis of variance among the mean CA's of subjects categorized into the several levels and treatment categories and the combinations of these. In only one comparison, between levels groups, did the F-ratio occur at a probability level less than .01. The data yielded by the paired comparisons (Table 6) indicated that the difference between each pair of means was a non-chance one. When the means were ranked from high to low, this order emerged: institutionalized retarded, non-institutionalized retarded, normal, and superior.

Table 5

Results of Analyses of Variance Among Mean Mental Ages, Chronological Ages, and Intelligence Quotients: Subjects Classified According to Levels and Original Treatment Categories

Source of Variation	df	Mean Squares		
		Mental Age	Chronological Age	Intelligence Quotient
Total	383	125.98	1,553.68	704.79
Between Cells	47	178.07	11,494.89	5,406.08
B	3	2,644.22***	178,544.70***	84,183.88***
D	1	3.56	92.04	57.04
C	5	7.02	217.00	41.03
BD	3	10.11	41.27	132.83
BC	15	14.26	104.61	20.96
DC	5	6.56	154.83	49.95
BDC	15	8.07	65.44	20.61
Within cells	336	118.69	163.10	47.17

*** Probability level of the associated F-ratio is less than .001.

Table 6

Results of *t*-tests of Differences Between Pairs of Mean Mental Ages, Chronological Ages, and Intelligence Quotients: Subjects Classified According to Major Levels Groups

Variable	Mental Age					
S^2	B1=91.48; B2=119.64; B3=83.83; B4=129.43					
$\bar{X}$	B1=116.64; B2=116.91; B3=126.70; B4=115.33					
Comparison	B1:B2	B1:B3	B1:B4	B2:B3	B2:B4	B3:B4
$F(S^2/S^2)$	1.31	1.10	1.42	1.43	1.08	1.54
$\bar{X} - \bar{X}$	0.27	10.06	1.31	9.79	1.58	11.37
t-ratio	0.257	10.590***	1.224	9.505***	1.386	10.829***
Relationship	B1=B2	B1<B3	B1=B4	B2<B3	B2=B4	B3>B4
Variable	**Chronological Age**					
S^2	B1=223.88; B2=90.08; B3=67.97; B4=243.60					
$\bar{X}$	B1=174.74; B2=114.52; B3=98.76; B4=185.48					
Comparison	B1:B2	B1:B3	B1:B4	B2:B3	B2:B4	B3:B4
$F(S^2/S^2)$	2.49	3.75***	1.09	1.33	1.49	3.58***
$\bar{X} - \bar{X}$	60.22	75.98	10.74	15.76	70.96	86.72
t-ratio	47.047***	61.772***	6.885***	17.319***	53.757***	68.283***
Relationship	B1>B2	B1>B3	B1<B4	B2>B3	B2<B4	B3<B4
Variable	**Intelligence Quotient**					
S^2	B1=21.49; B2=51.33; B3=77.28; B4=32.90					
$\bar{X}$	B1=69.58; B2=102.19; B3=129.14; B4=66.59					
Comparison	B1:B2	B1:B3	B1:B4	B2:B3	B2:B4	B3:B4
$F(S^2/S^2)$	2.39	3.60***	1.53	1.51	1.56	2.35
$\bar{X} - \bar{X}$	32.61	59.56	2.99	26.95	35.60	62.55
t-ratio	52.938***	83.417***	5.652***	32.906***	53.695***	82.848***
Relationship	B1<B2	B1<B3	B1>B4	B2<B3	B2>B4	B3>B4

*** $P < .001$

Intelligence Quotient

Data yielded by the analysis of the variance among mean IQ's are in Table 5. The mean IQ's of the treatment groups and the groups formed by the several treatments and levels combinations all were homogeneous. The F-ratio related to the levels factor occurred at a probability level which was less than .01. The results of the paired comparisons (Table 6) suggested the following. The non-institutionalized retarded group had a mean 3 points higher than that of the institutionalized retarded group. The rest of the differences were in the expected directions. That is, the two retarded groups had lower means than the normal and superior groups and the normal group had a lower mean than the superior group.

Sex

Comparisons of the frequencies listed in Table 4 indicated that the relationships between the distributions of males and females within the several major levels and base cell groups and the combinations of these were homogeneous with one exception. This exception occurred within base cell 11. Here, the proportion of males to females was less in the non-institutionalized retarded group than it was in the institutionalized retarded group.

Summary of Relationships Among Subject Characteristics

The statistical evidence presented would seem to justify the following conclusions about the subjects. The institutionalized and non-institutionalized retarded and normal populations sampled are similar in MA and different in IQ and CA. The populations represented by these three and the superior population or populations sampled are heterogeneous in MA, CA, and IQ. That is, the institutionalized retarded, the non-institutionalized retarded, and the normal subjects have equivalent MA's while the superior subjects' have MA's which are higher than any of these. The subjects may be arranged by descending size of CA in this manner: institutionalized retarded, non-institutionalized retarded, normal, and superior. Similarly, they may be arranged by decreasing size of IQ in this way: superior, normal, institutionalized retarded, and non-institutionalized retarded.

Generally, the distributions of males and females are homogeneous within the populations sampled. For each subject variable, the relationships cited are maintained within the several categories defined by the treatments both singly and in combination.

Tasks

The task variables were level of complexity and extent of overt verbalization. These variables were dimensionalized in the following manner: level of complexity--discrimination learning, rote learning, and concept formation; extent of overt verbalization--verbal and non-verbal. Six tasks were defined by the overlap of these variants. These included the discrimination learning verbal task, the discrimination learning non-verbal task, the rote learning verbal task, etc. The subsequent discussion consists of the definitions of terms employed in referring to the tasks, the criteria used in selecting or developing the tasks, and a description of each task in terms of its purpose, characteristics, materials, procedures and directions.

Definitions of Terms

For the purposes of this investigation, the terms employed in reference to the tasks were defined as follows.

1. Learning performance. Change in the learning response measures in the expected direction under the conditions of practice (McGeoch and Irion, 1952).
2. Level of complexity. Dimension reflecting the numbers of stimulus and response elements involved in the tasks and the relationships among these. (Underwood, 1949).
    a. Discrimination learning. Association of a single response with a single stimulus. Emphasis is upon the correct response being a function of the selection of and the subsequent response to the correct or positive stimulus from among several stimuli (Woodworth and Schlossberg, 1954; Underwood, 1949).

    b. Rote learning. Association and integration of a series of discrete responses with a series of discrete stimuli. Emphasis is upon the correct response being a function of the arbitrary association between the several pairs of discrete stimuli and responses (Underwood, 1949).

c. *Concept formation*. Association of a single response to a single representative of a group of stimuli which are categorized on the basis of a common underlying attribute. Emphasis is upon the correct response being a function of a generalizing process which follows a discrimination of similarities and differences among the stimuli (Underwood, 1949).

3. *Extent of task verbalization*. Dimension reflecting the means by which the stimuli are presented and responses are made (McGeoch and Irion, 1952).

   a. *Verbal task*. Task in which the subject is required to respond orally to orally presented stimuli when the investigator-subject face-to-face situation is at a maximum; *i. e.*, task in which overt response requires oral manipulation of nonsense syllables or words.

   b. *Non-verbal task*. Task in which the subject is required to respond manually to non-orally presented stimuli when the investigator-subject face-to-face situation is at a minimum; *i.e.*, task in which overt response requires manipulation of task materials containing letters, numbers, or other non-word symbols.

Task Selection Criteria

The task characteristics were determined primarily by the task variables as defined above. Nevertheless, these task characteristics were influenced by certain factors implicit in the nature of the investigation. These factors were the following: requirements for evaluating the relative effects of the reinforcement variants, use of the level of aspiration paradigm, characteristics of the subjects, and exigencies of research arrangements within the school situation. These factors necessitated the following task selection criteria.

1. *Individual administration*. The task had to be such that it could be administered to each subject individually.

2. *Interesting*. The activity had to be one in which the subject would not dislike participating.

3. *Novel*. The task (*i.e.*, the materials and/or the manner in which they were manipulated) had to be one with which it was believed that the subject had had no specific prior experience. However, the task could not be so removed from the subject's realm of experience that its uniqueness would constitute a disturbing factor.

4. *Appropriate time length*. Performance on the tasks could not be so time consuming that participation in the investigation would make unreasonable demands upon the time of the subjects who concurrently were engaged in academic work.

5. *Movable equipment.* The equipment and/or test material had to be such that they could be moved from location to location and used in rooms in which there were no special facilities.

6. *Non-fatiguing.* The activity had to be such that an adequate sample of the subject's performance could be obtained before he became fatigued.

7. *Wide range of possible scores.* The activity had to be such that subjects widely varying in CA and IQ all could respond with some improvement of performance; *i.e.*, it had to be neither too hard nor too easy and to have a scoring continuum over a relatively large number of trials.

8. *Control of information.* The activity had to be such that the investigator could control the signaling of the response measures, *i.e.*, the subject could obtain no independent knowledge of the adequacy of his responses.

9. *Similarity.* While the tasks had to reflect the several aspects of learning, consistency in general form and procedure was desirable in order to facilitate comparisons of responses among tasks.

10. *Ego-involving.* The task (*i.e.*, the materials and the manner in which they were manipulated) had to be similar enough to school activities and had to be presented in such a manner that the subjects would accept the situation as a *bona fide* one and would consider it highly important to respond as adequately as possible.

Description of the Tasks

A large number of learning studies were examined. Tentatively appropriate tasks or models were selected and adapted. These tasks were pilot tested extensively. Pilot subjects were second to fifth grade pupils who had normal intelligence. Modifications were made until all requirements appeared to be satisfied. The tasks thus developed were designated the discrimination learning verbal task (DLV), the discrimination learning non-verbal task (DLN), the rote learning verbal task (RLV), the rote learning non-verbal task (RLN), the concept formation verbal task (CFV), and the concept formation non-verbal task (CFN).[1]

Each task was presented to each subject individually. All tasks involved multiple items. To the subject, all were designated as tests. Before each task was initiated, the investigator worked through an example with the subject; every effort was made at this time and during the task administration to ensure that the subject understood how to perform the task.

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[1] Subsequently, the tasks are referred to by the letter abbreviations included in the parentheses.

In the verbal tasks the following conditions were maintained: the investigator employed a simultaneous oral and visual presentation of the task materials; the subject responded orally and the investigator orally designated the subject's responses as correct or incorrect; the subject had to discover the correct response by a process of elimination over several trials and he began by guessing; incorrect responses were so designated as they occurred. The corresponding conditions in the non-verbal tasks were these: the investigator presented the materials visually in the form of a pencil and paper task; the subject made a written response; a demonstration containing the correct responses was supplied and the subject was required to refer to it whenever necessary; incorrect responses, if they occurred, were cited after a trial was completed.

Each task is described below in terms of its purpose, characteristics, materials, procedures, and directions.

The Discrimination Learning Verbal Task

The McClelland (1942) technique for studying serial verbal discrimination learning was modified in terms of the requirements of the present investigation. The contrast method of discrimination learning was employed; *viz.*, the subject was required to respond to the selected positive stimulus and not to respond to similar simultaneously presented negative stimuli. The first trial is cited for illustration.

Trial 1	Cue Word	Response Alternates			
a	brafen	bwadex	bargnf	jaxemb	wahenj
b	gitsum	bivert	kygmrs	wospum	gmidav
c	kovjel	nakjoq	wekajy	vaxkeh	brokyl

The positive stimuli were the *f*, *t*, and *l* sounds. Respectively, these were imbedded in the cue words--brafen, gitsum, and kovjel--and in one of the four alternates in each item. The subject had to discover the positive stimuli and to demonstrate this discovery by choosing the correct alternates.

The investigator showed the subject a card containing each item and read to him the cue word and the four alternates. The subject began by guessing the correct alternate. The investigator verbally designated each guess as correct or incorrect. After the subject made a correct guess, the next item was initiated.

The task consisted of an example and 24 trials. The cue words remained the same throughout the trials. The alternates were changed each trial. In addition, the vertical positions of the cue words and the horizontal positions of the correct alternates were varied according to an irregular order from trial to trial.

The response measures were the number of responses required each trial to select the correct alternates and the time required to complete the trial.

Included in Appendix C are a presentation of the example and the complete task, a detailed description of the methods employed in constructing the task, and the procedures and directions employed in administering the task to the subject.

The Discrimination Learning Non-Verbal Task

The Woodworth-Wells (1911) cancellation test was adapted to conform to the requirements of the present investigation. As in the DLV, the contrast method was used. The initial trial is presented for illustration.

Trial 1

Demonstration--Positive Stimuli 2 9 6

Response Alternates	503	155	684	433	490	302	357
	718	307	170	210	747	500	110
	435	838	568	109	331	431	117
	841	953	340	328	585	516	388
	747	114	705	514	604	740	801
	597	782	184	385	708	834	860
	779	580	442	334	175	235	505
	136	723	771	953	553	709	350
	443	885	717	507	482	394	380
	140	317	632	718	457	815	884

The positive stimuli were the digits 2, 9, and 6. These were presented in the key and in 21 of the 70 three-digit alternates. For each positive stimulus, there were 7 correct alternates: three-digit number series containing the positive stimulus.

The subject had to refer to the demonstration to determine the positive stimuli and then to locate the correct alternates: those containing the positive stimuli.

Each trial was presented to the subject on a separate page. Referring to the key as often as necessary, he underlined with a pencil all of the correct alternates on the page. During the trial, the investigator noted the subject's inaccuracies and omissions, and after the trial was completed, called them to his attention. In general, errors were at a minimum.

The task consisted of 18 trials. The demonstration containing the positive stimuli remained the same for all trials. Changed from trial to trial were the combinations of numbers composing the alternates and the positions of the correct alternates within the context of the 70 three-digit number series.

The response measure was time required to complete each trial.

Included in Appendix D are a presentation of the example and the complete task, a detailed description of the method by which the task was constructed, and the procedure and directions employed in administering the task to the subject.

The Rote Learning Verbal Task

The RLV consisted of a variation of the conventional paired associates technique (Underwood, 1949). The anticipation method was employed. The materials used in initiating the task proper were the following.

Item	Stimuli	Responses
a	maz	wib
b	zic	huh
c	bef	yot
d	doj	paf
e	giq	jeh
Trial 1		
a	maz	
b	zic	
c	bef	
d	coj	
e	giq	

The subject had to learn the stimulus-response pairs and to demonstrate this knowledge by supplying orally the response number when the investigator said the stimulus number.

To initiate the task proper, the investigator showed the subject a card containing the five paired associates and read them aloud to him at the rate of about two seconds per pair. In Trial 1, the investigator exposed a card containing only the stimulus syllables. After the investigator read each stimulus syllable, the subject was required to say the response syllable. Wrong responses were so designated. When the correct response syllable was cited, it was labeled right and the next item was considered. If the subject could supply no response syllable or if he did not supply the correct response syllable within 10 seconds, the examiner named it and the next item was initiated.

There were 24 trials in the task. The stimulus-response pairs of syllables remained the same for all trials but their vertical placement in the list from trial to trial was determined according to an irregular order.

The response measures were the number of responses supplied per trial and the time required to complete the trial, 30 seconds being the maximum amount of time possible. The number of responses measure was obtained in the following manner. If the subject supplied the correct syllable in less than four responses, he was credited with that number. If he made more than four responses, he was credited with four. If he made no responses, he was credited with four. Therefore, the maximum number of responses score possible was 20.

In Appendix E are contained a presentation of the example and the 24 trials of the task, a detailed description of the method by which the task was constructed, and the procedure and directions employed in administering the task to the subject.

The Rote Learning Non-Verbal Task

The letter-digit substitution task employed by Johnson (1960) was altered to conform to the task criteria. It involved the paired associate method. Below is a reproduction of the first trial.

Trial 1

Demonstration--Stimuli-Responses

A	B	C	D	E	F	G	H	I
2	9	4	1	7	5	3	8	6

Stimuli

H	I	D	H	B	I	E	D	G

D	B	G	B	E	F	D	G	H

A	D	F	G	C	D	C	B	I

G	I	E	A	C	B	F	A	H

The subject had to learn the nine letter-digit stimulus-response pairs. He proceeded by referring to the demonstration as often as necessary and writing the correct responses in the blanks under each stimulus.

Each trial was contained on a separate page. One trial at a time was presented to the subject and he responded by writing the digits. One trial consisted of eight presentations of each stimulus. The subjects committed a minimum of errors and these were pointed out after each trial.

Eighteen trials constituted the task. The key demonstrating the stimulus-response pairs was presented in the same form on every trial over the 18 trials. The order for presenting the stimuli to which the subject supplied responses was varied in an irregular fashion from trial to trial.

The response measure was the time required to complete each trial.

Appendix F consists of the materials used in the example and the total 18 trials of the task, a description of the methods employed in the task construction, and the procedures and directions used to administer the task to the subject.

The Concept Formation Verbal Task

The CFV was based upon the principles and techniques used by Heidbredder (1947) and by Hull (1920) in their studies of concept formation. The paired associate method was used. Trial 1 is presented for illustration.

Trial 1	Category Name	Response Alternates			
a	sebi	banana	church	six	radio
b	mufa	face	carpenter	pine	chapter
c	bafo	pheasant	page	drum	calf

The subject was required to develop or learn three concepts. These involved the association of three nonsense syllable names with three categories or classes of common nouns: bafo--animals, sebi--numbers, mufa--parts of people.

The investigator showed the subject a card containing one item and read aloud the category name and the four object nouns. The subject had to discover which noun belonged to the class represented by the category name. He began by guessing. The investigator verbally designated the responses as correct or incorrect. After the subject made a correct selection, the next item was initiated.

There were 24 trials in the task. The category names remained the same. The object nouns were changed every trial. From trial to trial an irregular order was used in the vertical placement of the category names and in the horizontal placement of the correct object nouns.

The response measures were the number of responses required per trial to make the three correct selections and the time required to complete each trial.

Appendix G contains the complete task materials, a description of the procedures used in constructing the task, and the procedure and directions employed in administering the task to the subject.

The Concept Formation Non-Verbal Task

The Woodworth-Wells (1911) substitution task was the model on which the CFN was constructed. The paired associate procedure was used. The following is a representation of Trial 1.

Trial 1

Demonstration--Category
Symbol-Class
Objects __+__ a __=__ -a- __)__ 6 __/__ -6-

Stimuli.	______ f	______ 2	______ p	______-3-
	______ 3	______-5-	______-w-	______-x-
	______-s-	______ j	______ 4	______8
	______-9-	______-y-	______-6-	______v
	______ 5	______-u-	______-g-	______-4-
	______-7-	______-z-	______-i-	______-7-
	______ a	______ b	______ 9	______-k-

The subjects were required to learn to associate the four category symbols with the four classes of stimuli. Respectively, these were + --letters, = --struck through letters,) --numbers, and √ --struck through numbers.

Each trial was presented on a separate page. The subject was exposed to one trial at a time. He referred to the demonstration and wrote the correct category symbol in the blank preceeding the class stimulus. Errors were few but these were called to the subject's attention at the end of each trial.

The task consisted of 18 trials. In each trial, there were seven representatives of each of the four categories of material. These class representatives and their positions in the series were changed according to an irregular order every trial. The demonstration key remained the same throughout the 18 trials.

The response measure was the time required to complete each trial.

Appendix H includes a complete presentation of materials employed in the example and 18 trials, a description of the procedures involved in constructing the task, and the directions and procedures used to administer the task to the subject.

Reinforcement Variables

The 384 subjects performed each of the six tasks in conjunction with the overlapping reinforcement variables. These treatments were designated reinforcement type-frequency and reinforcement orientation and were administered within the framework of the level of aspiration technique. Briefly, the study involved two pairs of control subgroups and eight treatments subgroups within each of the four major levels groups: non-institutionalized retarded, normal, superior, and institutionalized retarded. The subjects in one pair of control subgroups received speed and accuracy directions and information concerning the response measures related to their performance. The subjects in the other pair of control subgroups received the speed and accuracy directions, set levels of aspiration, and received information concerning the response measures related to their performance; this information became success or failure information depending on what actually occurred within the level of aspiration--performance sequence. The eight treatment subgroups received the speed and accuracy directions, set levels of aspiration, and received different frequencies of controlled success and failure information oriented within either the individual or the group frame of reference.

The subsequent sections encompass the definitions of terms ~~used~~ germane to these reinforcement variables and the procedures employed in administering them to the subjects.

Definitions of Terms

For the purposes of this investigation, the following definitions of terms were employed in reference to the reinforcement variables.

1. Level of aspiration technique. Technique in which the subject is required to make estimates of what his subsequent performance will be after his previous performance has been described to him.

2. Type of reinforcement. Presentation of success or failure information.

    a. Success. Attainment by the subject of a performance score (time) which is equal to or less than the score set by him as his goal.

    b. Failure. Attainment by the subject of a performance score (time) which is more than the score set by him as his goal.

3. Frequency of reinforcement. Percentage reflecting the number of trials on which success or failure information is presented to the subject.

4. Orientation of reinforcement. Frame of reference or context within which the subject's success or failure information is presented.

    a. Individual. Success or failure information framed within the context of the subject's own performance on previous trials.

b. Group. Success or failure information framed within the context of the performance of other boys or girls in the subject's age group.

Procedures for Administration

Two diagrams will facilitate exposition of the procedures employed in administering the reinforcement variables. Figure 2 represents the basic paradigm of the investigation; it serves to illustrate the overlapping dimensions of the reinforcement variables and the 12 subgroups[1] thereby defined. Reference to this figure reveals that three sets of directions and six types of performance information were required. The reinforcement schedule is summarized in Figure 3. This schedule includes the order in which these several sets of directions and performance information were used with the several subgroups.

Directions and Performance Information

As stated, three sets of directions and six types of performance information were necessary. The directions included the task instructions, the speed and accuracy instructions, and the level of aspiration instructions. The sets of performance information consisted of those given in each of the following types of situations: speed and accuracy control, level of aspiration control, success--individual, success--group, failure--individual, and failure--group. The task directions are included in Appendices C through H. The remaining types of directions and performance information are presented below.

Speed and accuracy directions.--Instructions for accuracy were administered within the framework of the specific task directions (Appendices C through H). These were reiterated briefly in combination with the directions for speed which were given at the end of the task directions and at the beginning of each trial. The models used are cited below. Although the essence remained the same, these comments were paraphrased from trial to trial in order to preclude undue repetition of the same words.

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[1] For the remainder of the discussion the procedure will be described in terms of the 12 subgroups. There were 12 corresponding subgroups in each major levels group and identical procedures were employed for subjects within the respective subgroups of each major levels group.

Figure 2-Basic Paradigm of the Investigation[a]

	(C) Type-Frequency	(C1) 100% Success	(C2) 66% Success--33% Failure	(C3) 33% Success--66% Failure	(C4) 100% Failure	(C5) Level of Aspiration Control	(C6) Speed and Accuracy Control
D Orientation	(D1) Individual	(C1D1)	(C2D1)	(C3D1)	(C4D1)	(C5D1)	(C6D1)
	(D2) Group	(C1D2)	(C2D2)	(C3D2)	(C4D2)	(C5D2)	(C6D2)

[a] C1D1: 100% success, individual orientation
C1D2: 100% success, group orientation
C2D1: 66% success--33% failure, individual orientation
C2D2: 66% success--33% failure, group orientation
C3D1: 33% success--66% failure, individual orientation
C3D2: 33% success--66% failure, group orientation
C4D1: 100% failure, individual orientation
C4D2: 100% failure, group orientation
C5D1: Level of aspiration control, no orientation
C5D2: Level of aspiration control, no orientation
C6D1: Speed and accuracy control, no orientation
C6D2: Speed and accuracy control, no orientation

> (After task directions) Now you know what to do. You are to try to get them all right as quickly as you can. Sometimes, your teacher may ask you to work as fast as you can or to do as many as you can. Then, you try to get all of the problems right as fast as you can. Well, that's what you are supposed to do with this test. The faster you do them right, the better score you make.
>
> (Subsequent trials) Here is the next trial. Remember, you are supposed to get all of the problems right as fast as you can. The less time you take, the faster you are, and the faster you do the problems right, the beter score you get.

Level of aspiration directions.--The levels of aspiration were set within the framework of the time in seconds required to complete a trial accurately. The emphasis was on the score the subject thought he could make and thus that he was going to try to make. Paraphrased versions of the following model were used.

> (After speed and accuracy directions) Now you know what to do. On each trial, you have tried to get all of the problems right as fast as you could. In other words, you tried to take as little time as possible to do them all right. And, the faster you have done them, the better your score has been. Now, I want to tell you something else. Do you know what a goal is? A goal is something you try to do, something you think you should be able to do, so you work for it. For instance, when you play ball/hop scotch you try to win the game. Your goal is to win. Or, when you do arithmetic you try to get as many problems right as you can. Each day you try to do better; for example, your goal is to work more and more problems right. What is another goal you work for in your class? (Discuss with the subject some goal connected with his classroom activities.) That's the idea. A goal is something you try to do, something you work for. You know with these problems you have been working here, you have been trying to get them all right as fast as you could. That was your goal. In other words, you were trying to make as good a score as possible. And each trial you have been trying to do better, to improve your score by getting the problems all right as fast as you could. Now, on the rest of these trials, I want you to tell me what your goals are. I want you to figure out what score you are trying to make. In other words, I want you to tell me how many seconds it's going to take you to do all of the problems right, how fast you are trying to do all of the problems right. Your score on the last trial was __ seconds. You got all of the right answers in __ seconds. What score are you going to try for on trial ___ ? How fast are you going to try to do it? How many seconds will it take you to get all of the problems right during the next trial?
>
> (Subsequent trials: After speed and accuracy directions) Now, your score on that last trial was __ seconds. What score are you going to make next time? In how many seconds are you going to get all of the next problems right?

Performance information--speed and accuracy control.--In the verbal tasks, information about accuracy was given after every response; in the non-verbal tasks, at the end of the trial. Information about speed was given at the end of each trial. The actual time required to complete a trial successfully was designated the attainment time. This was recorded and used as a response measure in the analyses of results. However, because of the nature of the procedures employed with the high frequency success groups, it was possible in the cases of some subjects to exhaust the units in the time continuum during the goal setting process. It was necessary to minimize the likelihood of such an occurrence because success and failure were administered within the context of time; therefore, an arbitrary constant of 100 was added to the subject's actual attainment time. This derived score, designated the reported time or reported score, was used in all tasks except the RLV; here an arbitrary constant of 150 was added to the actual attainment time to obtain the reported time.

These reported times were represented to the subjects as scores. As scores, they were emphasized as reflectors of performance adequacy. Since time scores were used, low scores were associated with relatively superior performance and high scores with relatively inferior performance.

The following types of comments were employed in relaying performance information to subjects in all subgroups during Phase I of the tasks and to the subjects in the speed and accuracy control subgroups during the entire task.

> (Phase I, all subgroups; Phases I, II, and III, speed and accuracy control subgroups: C6D1, C6D2). That trial took you ___ seconds (reported score). Your score was ___seconds. You got them all right in ___ seconds.

Performance information--level of aspiration control.--The performance information given to the subjects in the level of aspiration control subgroups was essentially the same as that given to the subjects in the speed and accuracy control situations; i.e., they were told their reported times which were the actual attainment times plus 100 seconds (or 150 seconds for the RLV). However, there was one difference. Their score for each trial was related to the goal they set for that trial. The following comments represent the general format of the information given to the subjects.

> (Phases II and III, level of aspiration control subgroups: C5D1, C5D2). You said that your goal for that trial was ___ seconds (level of aspiration time). You were trying to get all of the problems right in ___ seconds. Actually, it took you (less or more) time than that. It took you ___seconds (reported score).

Performance information--success and failure.--Success or failure (as defined) was ensured for the subjects in the appropriate eight subgroups by adding or subtracting arbitrarily specified numbers of seconds from their levels of aspiration and relaying these times to them as scores. Listed in column 2 of Figure 3 are the amounts of seconds added or subtracted each trial. On success trials, the specified time was subtracted from the level of aspiration time set by the subject for that trial and he was told that he performed the trial in less time than he thought he could; thus, he made a better score than that set by him as his goal. On failure trials, the specified time was added to the subject's level of aspiration time and he was informed that the trial performance required more time than he thought it would; hence he made a worse score than that indicated by him as his goal. In selecting these amounts of time to be added or subtracted, it was decided arbitrarily that the amount or size of the alterations of the levels of aspiration would be within the limits of four to seven seconds. The four digits were arranged so they would occur with equal frequency but in irregular order over the 16 trials in which controlled success or failure information was furnished. Once established, this system of order and amount was used for all of the subjects and for all of the tasks.

The type of performance information used for the several success--failure subgroups and the frequency with which each type was employed over the several trials was specified on the basis of the designations in columns 3 through 6 of Figure 3. Subjects in the C1 and C4 subgroups were administered success or failure information respectively on all trials of Phase II. Subjects in the C2 and C3 subgroups received differential frequencies of success and failure information. For the C2 subgroups, four of the 12 trials in Phase II were designated failure trials; the remaining eight trials were success trials. For the C3 subgroups, eight of the 12 trials were selected as failure trials with the remaining four trials being success trials. Once so determined, these designations were used for all of the subjects in these subgroups and for all of the tasks. All subjects received success information on the four trials of Phase III.

The success or failure information administered to the subjects was stated within the two frames of reference reflecting the orientation variants. The first was desigrated the individual orientation; the second, the group orientation. In the individual orientation, the subject's

Figure 3

Reinforcement Schedule

		Treatment Groups[a]					Control Groups	
Phase	(1) Trial	(2) Am't ±LA	(3) C1 (D1,D2)	(4) C2 (D1,D2)	(5) C3 (D1,D2)	(6) C4 (D1,D2)	(7) C5	(8) C6
I[b]	1 1 2 : 8	All groups: speed and accuracy directions; reported scores.						
II	1	±5	S	S	F	F	Speed and accuracy directions. Level of aspiration directions. Reported scores.	Speed and accuracy directions. Reported scores.
	2	±7	S	S	F	F		
	3	±4	S	S	S	F		
	4	±6	S	F	F	F		
	5	±6	S	F	F	F		
	6	±4	S	S	S	F		
	7	±7	S	S	S	F		
	8	±5	S	F	F	F		
	9	±4	S	S	F	F		
	10	±6	S	S	F	F		
	11	±5	S	S	S	F		
	12	±7	S	F	F	F		
III	1	-5	S	S	S	S		
	2	-6	S	S	S	S		
	3	-6	S	S	S	S		
	4	-7	S	S	S	S		

[a] During Phases II and III, speed and accuracy directions and level of aspiration directions were administered to these subjects. The cited material refers to the additional type and frequency of success or failure information which was framed within the individual or group orientation depending upon the specific C x D combination.

[b] Phase I included 2 trials for the 3 non-verbal tasks and 8 trials for the 3 verbal tasks.

performance on each trial was compared to his performance on the previous trials. Conversely, in the group orientation, the subject's performance on each trial was compared to that of others in the same sex and chronological age groups.

The models for the four sets of performance information employed with the subjects in the success and failure subgroups are cited below.

> (Phase II, success--individual orientation subgroups: C1D1, C2D1 C3D1; Phase III, all D1 subgroups). You said that your goal for that trial was ___ seconds (level of aspiration time). Actually, it took you less time than that. It took you ___seconds (level of aspiration time minus specified time).
>
> That's faster than you said you could do it. That's a better score than you said you could make. You did better than you thought you would do.
>
> In fact, you did better on that trial than you have been doing on most of the other, past trials. In other words, you were able to do all of the problems right faster than you were able to do them on most of the other, past trials. You are beating the scores you made on the other trials.
>
> (Phase II, success--group orientation subgroups: C1D2, C2D2, C3D2; Phase III, all D2 subgroups). You said that your goal for that trial was ___seconds (level of aspiration time). You were trying to get all of the problems right in ___seconds. Actually, it took you less time than that. It took you ___seconds (level of aspiration time minus specified time).
>
> That's faster than you said you could do it. That's a better score than you said you could make. You did better than you thought you would do.
>
> In fact, you did better on that trial than most (boys--girls) your age can do. In other words, you were able to do all of the problems right faster than most (boys--girls) your age are able to do. You are beating the scores made by other (boys--girls) your age.
>
> (Phase II, failure--individual orientation subgroups: C2D1, C3D1, C4D1). You said that your goal for that trial was ___ seconds (level of aspiration time). You were trying to get all of the problems right in ___ seconds. Actually, it took you more time than that. It took you ___seconds (level of aspiration time plus specified time).
>
> That's slower than you said you could do it. That's not as good a

score as you said you could make. You did not do as well as you thought you would do.

In fact, you did not do as well on that trial as you have been doing on most of the other, past trials. In other words, you were not able to do all of the problems right as fast as you were able to do them on most of the other, past trials. You are not beating the scores you made on the other trials.

(Phase II, failure--group orientation subgroups: C2D2, C3D2, C4D2). You said your goal for that trial was _____ seconds (level of aspiration time). You were trying to get all of the problems right in _____ seconds. Actually, it took you more time than that. It took you _____ seconds (level of aspiration time plus specified time).

That's slower than you said you could do it. That's not as good a score as you said you could make. You did not do as well as you thought you would do.

In fact, you did not do as well on that trial as most (boys--girls) your age can do. In other words, you were not able to do all of the problems right as fast as most (boys--girls) your age are able to do. You are not beating the scores made by other (boys--girls) your age.

Reinforcement Schedule

The reinforcement schedule was employed as a guide for ordering the use of the several sets of directions presented above. This schedule is illustrated in Figure 3. The materials included in the figure may be explained as follows. The administration of the total number of trials of a task consisted of three possible phases. During Phase I, all of the subjects were administered the directions related to speed and accuracy and performance information in the form of the reported time score. There were two purposes for this phase. First, it furnished the subjects a base for setting their levels of aspiration. Second, it enabled the investigators to obtain measures of the subject's initial performance levels which were necessary for the analyses of results.

During Phases II and III, the subjects in the speed and accuracy control subgroups (C6D1, C6D2) continued to perform under only these directions and to be told their reported scores (actual attainment time plus 100 or 150). The subjects in the other subgroups received these directions alone and this type of performance information for only a selected number of trials. Since performance changes were more rapid in the non-verbal tasks, Phase I included only two trials for these tasks. For the verbal tasks, more initial practice was required before apparent performance changes occurred; therefore, Phase I consisted of eight trials.[1]

During Phase II, in addition to the speed and accuracy directions, the subjects in the subgroups C1 through C5, D1 and D2, were administered the level of aspiration and differential success--failure sequences. This phase consisted of 12 trials. The first level of aspiration was set at the final trial of Phase I (trials 2 and 8 for the non-verbal and verbal tasks, respectively) and pertained to the first trial of Phase II (trials 3 and 9 for the two types of task, respectively).

At the end of the third or ninth trial, the level of aspiration control subgroups (C5D1, C5D2) were told their reported scores (actual attainment time plus 100 or 150). These two control subgroups continued to perform under these conditions during Phases II and III; i.e., at the beginning of the trial, they received the speed and accuracy directions and set levels of aspiration and at the end of the trial they were given their reported scores.

At the end of the third or ninth trial, the controlled success or failure information (level of aspiration plus or minus the specified time) was presented to the subjects in the appropriate subgroups. This procedure, the administration of differential frequencies of success and failure information to the several subgroups, was continued throughout the 12 trials of this phase. Reference to Figure 2 (columns 3 through 6) reveals the type of performance information administered to each subgroup on each trial. The 100% success subgroups (C1D1, C1D2) received success information at the end of each of the 12 trials. The 100% failure subgroups (C4D1, C4D2) received failure information on these trials. The 66% success--33% failure subgroups (C2D1, C2D2) received success information on eight of the 12 trials and failure information on four; conversely, the 66% failure--33% success subgroups (C3D1, C3D2) were given failure information on two-thirds of the 12 trials and success information on one-third.

Phase III included the administration of four terminal trials in which all of the success--failure subgroups received success information. (The two pairs of control groups continued to receive the reported scores.) The purpose of this phase was to ensure that each subject receiving any frequency of failure terminated his participation in the task with a substantial success experience.

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[1] These statements about performance changes are based upon analyses of the pilot test data.

The information contained in Figures 1 and 2 and discussed in detail above is summarized below in terms of the specific procedure followed with each of the 12 subgroups.

C1D1: 100% success, individual orientation.

Phase I--Speed and accuracy directions, reported scores.

Phase II--Speed and accuracy directions, level of aspiration directions, success information framed within the individual orientation on each of the 12 trials of this phase.

Phase III--Speed and accuracy directions, level of aspiration directions, success information framed within the individual orientation on each of the four trials.

C1D2: 100% success, group orientation.

Phase I--Speed and accuracy directions, reported scores.

Phase II--Speed and accuracy directions, level of aspiration directions, success information framed within the group orientation on each of the 12 trials of this phase.

Phase III--Speed and accuracy directions, level of aspiration directions, success information framed within the group orientation on each of the four trials.

C2D1: 66% success--33% failure, individual orientation.

Phase I--Speed and accuracy directions, reported scores.

Phase II--Speed and accuracy directions, level of aspiration directions, success information framed within the individual orientation on trials 1, 2, 3, 6, 7, 9, 10, and 11 of this phase and failure information framed within the individual orientation on trials 4, 5, 8, and 12 of this phase.

Phase III--Speed and accuracy directions, level of aspiration directions, success information framed within the individual orientation on each of the four trials.

C2D2: 66% success--33% failure, group orientation.

Phase I--Speed and accuracy directions, reported scores.

Phase II--Speed and accuracy directions, level of aspiration directions, success information framed within the group orientation in trials 1, 2, 3, 6, 7, 9, 10, and 11 of this phase and failure information framed within the group orientation on trials 4, 5, 8, and 12 of this phase.

Phase III--Speed and accuracy directions, level of aspiration directions, success information framed within the group orientation on each of the four trials.

C3D1: 33% success--66% failure, individual orientation.

Phase I--Speed and accuracy directions, reported scores.

Phase II--Speed and accuracy directions, level of aspiration directions, success information framed within the individual orientation on trials 3,6,7, and 11 of this phase and failure information framed within the individual orientation on trials 1, 2, 4, 5, 8, 9, 10, and 12 of this phase.

Phase III--Speed and accuracy directions, level of aspiration directions, success information framed within the individual orientation on each of the four trials.

C3D2: 33% success--66% failure, group orientation.

Phase I--Speed and accuracy directions, reported scores.

Phase II--Speed and accuracy directions, level of aspiration directions, success information framed within the group orientation on trials 3, 6, 7, and 11 of this phase and failure information framed within the group orientation on trials 1, 2, 4, 5, 8, 9, 10, and 12 of this phase.

Phase III--Speed and accuracy directions, level of aspiration directions, success information framed within the group orientation on each of the four trials.

C4D1: 100% failure, individual orientation.

Phase I--Speed and accuracy directions, reported scores.

Phase II--Speed and accuracy directions, level of aspiration directions, failure information framed within the individual orientation on each of the 12 trials of this phase.

Phase III--Speed and accuracy directions, level of aspiration directions, success information framed within the individual orientation on each of the four trials.

C4D2: 100% failure, group orientation.

Phase I--Speed and accuracy directions, reported scores.

Phase II--Speed and accuracy directions, level of aspiration directions, failure information framed within the group orientation on each of the 12 trials of this phase.

Phase III--Speed and accuracy directions, level of aspiration directions, success information framed within the group orientation on each of the four trials.

C5D1 and C5D2: Level of aspiration control.

Phase I--Speed and accuracy directions, reported scores.

Phase II--Speed and accuracy directions, level of aspiration directions, reported scores.

Phase III--Speed and accuracy directions, level of aspiration directions,reported scores.

C6D1 and C6D2: Speed and accuracy control.

Phase I--Speed and accuracy directions, reported scores.

Phase II--Speed and accuracy directions, reported scores.

Phase III--Speed and accuracy directions, reported scores.

Task by Reinforcement Schedule

The above presented procedures for administering the reinforcement variables were used with each of the six tasks. It was desirable to ensure that a subject did not perform more than one task under any specific combination of variants. To do so, the six type-frequency (C) variants were arranged in irregular order for each base cell group so that no group was administered a variant more than once. The two orientation (D) variants were alternated so that each group performed under the D1 variant on three tasks and under the D2 variant on three tasks.

Listed below are the irregular orders of the C conditions used for base cell groups 1 to 6 and 7 to 12.

Task	Base Cell Groups 1 to 6						Base Cell Groups 7 to 12					
	C1	C2	C3	C4	C5	C6	C1	C2	C3	C4	C5	C6
DLV	1	2	3	4	5	6	7	8	9	10	11	12
RLV	3	5	6	1	2	4	10	7	8	9	12	11
CFV	2	6	1	3	4	5	11	10	12	8	7	9
DLN	4	1	2	5	6	3	9	11	10	12	8	7
RLN	6	4	5	2	3	1	12	9	7	11	10	8
CFN	5	3	4	6	1	2	8	12	11	7	9	10

Base cell groups 1 to 6 received the D1 variant on tasks 1, 3, and 5 and the D2 variant on tasks 2, 4, and 6. This was reversed for base cell groups 7 to 12. The variants to which the subjects in each base cell group were exposed as they performed in the several learning situations become more apparent when the material is rearranged according to tasks. The resulting task by reinforcement schedule is presented in Figure 4.

Figure 4

Task by Reinforcement Schedule

Base Cell Group	Tasks/Reinforcement Variants					
	DLV	RLV	CFV	DLN	RLN	CFN
1	C1D1	C4D2	C3D1	C2D2	C6D1	C5D2
2	C2D1	C5D2	C1D1	C3D2	C4D1	C6D2
3	C3D1	C1D2	C4D1	C6D2	C5D1	C2D2
4	C4D1	C6D2	C5D1	C1D2	C2D1	C3D2
5	C5D1	C2D2	C6D1	C4D2	C3D1	C1D2
6	C6D1	C3D2	C2D1	C5D2	C1D1	C4D2
7	C1D2	C2D1	C5D2	C6D1	C3D2	C4D1
8	C2D2	C3D1	C4D2	C5D1	C6D2	C1D1
9	C3D2	C4D1	C6D2	C1D1	C2D2	C5D1
10	C4D2	C1D1	C2D2	C3D1	C5D2	C6D1
11	C5D2	C6D1	C1D2	C2D1	C4D2	C3D1
12	C6D2	C5D1	C3D2	C4D1	C1D2	C2D1

General Procedure

The six tasks were administered individually to the 384 subjects. One task was administered to a subject in a single session. In most cases, these sessions required 45 minutes to one hour and all occurred during the school day. The investigator met the subject in a private room within the school; these rooms were free from excessive or unusual noise and interruption during the task administration. An individual schedule sheet was prepared for each subject. In addition to subject data, the schedule sheet contained information about the combination of conditions under which the subject performed each task. The material cited in Figure 5 is a representative example.

Figure 5

Subject Schedule

Subject Code Number ______________ Subject Name ______________
Base Cell Group ______________ Teacher ______________
Subject Number in Base Cell Group ______________ School ______________
Room ______________

Task	DLV	RLV	CFV	DLN	RLN	LFN
Conditions						
Date Administered						
Administrator						

The exigencies of the research situation precluded a counterbalanced order of task administration which would have been most desirable for maximum control in an investigation of the present type. Therefore, the following order of task administration was used for all subjects. The first task to be administered was the RLN. When about one-half of the RLN were administered, the DLV and DLN were introduced. When most of the latter tasks were administered, the RLV and CFN were initiated. When the majority of these were administered, the CFV was started. During the overlapping periods of task administration, the respective tasks were presented interchangeably.

The non-institutionalized retarded, normal, and superior subjects attended 23 schools[1] located within a 50 mile radius of Syracuse, New York. Ten investigators administered tasks regularly during a four and one-half month period in the winter and spring of 1959. The institutionalized retarded subjects were from two institutions within a 50-75 mile radius of Syracuse, New York. Two investigators administered the tasks to these subjects regularly during a four and one-half month period in the winter and spring of 1961. No systematic order of schools, reinforcement variants, or subjects was employed. Rather, within any two-week period, investigators worked in all schools administering tasks under the several reinforcement variants to retarded, normal, and superior subjects. In most cases, an interval of at least two or more weeks occurred between the administration of any two tasks to a subject. Every effort was made to schedule so that one investigator did not present two consecutive tasks to any one subject; such repetition was prevented in all but a few cases.

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[1] During the organization of the record-keeping and scheduling procedures, the several schools in the smaller school systems were grouped according to location and each school system was assigned one school code number; consequently, the upper limit of the school code numbers and the number of schools cited above are not equal.

Plan for Analyses of Results

The considerations involved in analyzing and reporting the data obtained in the investigation are reducible to three topics: response measures, data organization, and statistical procedures. These topics are discussed in detail in this section.

Response Measures

The research objectives involved two dependent variables, learning performance and level of aspiration behavior related to the six tasks. The response measures selected to reflect these variables were the following: learning performance--attainment time and number of responses scores; level of aspiration behavior--absolute, positive, and negative goal discrepancy scores and frequencies reflecting numbers of times subjects changed their goals in the several directions after attainment or non-attainment of their immediately preceding goals.

A score sheet used with one task is included to illustrate the manner in which the several types of response measures were obtained for the six tasks (Figure 6)[1]. The response measures reflecting learning performance

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[1] The score sheets employed with the other tasks were essentially the same as the one presented.

Figure 6

Score Sheet--Verbal Tasks

Name ________________________ S. Code # ________________________

School -- Grade ________________ Task ________________________

Date ________________________ Exp. Conds. ________________________

										(Column 1) Trial #														
Col. #		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
2 Amt±										±5	±7	±4	±6	±6	±4	±7	±5	±4	±6	±5	±7	-5	-6	-6	-7
3 C2										S	S	S	F	F	S	S	F	S	S	S	F	C1, C2, C3, C4 All Success			
4 C3										F	F	S	F	F	S	S	F	F	F	S	F				
5 #R																									
6 Att.T																									
7 L.A.1																									
8 Rep.T																									
9 L.A.2																									
10 G.D.& Sign																									
11 (Frequency Response to Success and Failure. 7:8::L.A.1: L.A.2)	S:N.C.																								
	F:N.C.																								
	F:L																								
	F:R																								
	S:L																								
	S:R																								

were located as follows: the attainment time scores were in Column 6 and the number of responses scores were in Column 5. The level of aspiration measures, the goal discrepancy scores,and frequencies related to direction of goal changes after attainment or non-attainment, were based on the information listed in Columns 8 through 11. The goal discrepancy score (Column 10) was computed in the conventional manner: subtracting the reported performance time for a trial (Column 8) from the level of aspiration (Column 9) set for that trial. Because levels of aspiration were set in terms of time and relatively high goals were reflected by relatively low time scores and vice versa, the subtractive procedure was reversed so that goals higher than the performance level would be associated with a positive sign and goals lower than the performance level, with a negative sign. The frequency measures reflecting directions of goal changes were computed in six categories (Column 11): raising the goal after success (S:R); lowering, after success (S:L); raising, after failure (F:R); lowering, after failure (F:L); no change, after success (S:NC); and no change, after failure (F:NC). Direction of goal change was determined by subtracting the level of aspiration set for a trial from that set for the immediately preceding trial (Column 10). Positive remainders reflected raised goals (in the case of time scores); negative remainders, lowered goals; and zero remainders, no change in goals. On the basis of the relationship between the remainder thus obtained and the observation whether success or failure occurred on a trial (Columns 7-8), the digit one was entered into the appropriate category.

For all tasks, the several response measures were analyzed statistically at four practice levels. Explaining the manner in which the trials of the verbal and non-verbal tasks were divided into the four practice levels or sections is facilitated by recounting the several phases used in reinforcement administration.

	Phase I	Phase II	Phase III
Non-verbal tasks	Trials 1-2	Trials 3-14	Trials 15-18
Verbal tasks	Trials 1-8	Trials 9-20	Trials 21-24

Phase I involved the subject's performance on a task without manipulation of reinforcement. Goals were set on trials 2 and 8 for the non-verbal and verbal tasks, respectively. Differential success and failure information was administered during the twelve trials of Phase II; 100% success information was administered during the trials of Phase III. In categorizing trials into practice levels, this same division of trials was used; in addition, Phase II was divided into two equal parts. Consequently, the trials were grouped as follows: section 1, for attainment times and number of responses scores, all of the trials of Phase I and for the goal discrepancy scores, the last trial of Phase I; section 2, for all measures, the first six trials of Phase II; section 3, for all measures, the second six trials of Phase II; section 4, for all measures, all trials of Phase III.

Data Organization

Classifying, preparing, analyzing, and reporting the information implicit in the response measures involved manipulating a large mass of data. To facilitate the work, these data were reduced or organized according to alphanumeric symbols which were used as much as possible. These symbols and their labels are listed below; they are used singly and in their various combinations in all statistical analyses and tabular presentations.

A, practice level: A1, scores on section 1 of the trials; A2, scores on section 2 of the trials; A3, scores on section 3 of the trials; A4, scores on section 4 of the trials.

B, levels: B1, non-institutionalized retarded subjects; B2, normal subjects; B3, superior subjects; B4, institutionalized retarded subjects.

C, reinforcement type-frequency: C1, 100% success; C2, 66% success--33% failure; C3, 33% success--66% failure; C4, 100% failure; C5, level of aspiration control; C6, speed and accuracy control.

D, reinforcement orientation: D1, individual orientation; D2, group orientation.

S, sex: S1, male subjects; S2, female subjects.

Statistical Procedures

Two types of statistical analyses were used. One type was applicable to data in an interval scale--the attainment time scores, the number of responses scores, and the three types of goal discrepancy scores. The other type was appropriate for data in a nominal scale--the frequencies reflecting the directions of goal changes after attainment or non-attainment of previously set goals.

The analyses used for the data in the interval scale are considered first.

In order to normalize the score distributions and to ensure homogeneity of score variance, all scores were transformed. The transformation formula used was $\sqrt{X + .5}$. Relationships among means were evaluated by analysis of covariance. The statistical model used to describe the data is cited below.

$$Y_{ijkl} = b + B_i + D_j + C_k + S_l + (BD)_{ij} + (BC)_{ik} + (BS)_{il} + (DC)_{jk} + (DS)_{jl}$$
$$+ (CS)_{kl} + b1\ (X_1 - \bar{X}_1) + b2\ (X_2 - \bar{X}_2) + b3\ (X_3 - \bar{X}_3) + e_{ijkl}$$

where

b = the overall mean
B_i = the effect of the i^{th} major levels group
D_j = the effect of the j^{th} reinforcement orientation group
C_k = the effect of the k^{th} reinforcement type-frequency group
S_l = the effect of the l^{th} sex group
$(BD)_{ij}$ = the interaction effect of the i^{th} major levels group with the j^{th} reinforcement orientation group
$(BC)_{ik}$ = the interaction effect of the i^{th} major levels group with the k^{th} reinforcement type-frequency group
$(BS)_{il}$ = the interaction effect of the i^{th} major levels group with the l^{th} sex group
$(DC)_{jk}$ = the interaction effect of the j^{th} reinforcement orientation group with the k^{th} reinforcement type-frequency group
$(DS)_{jl}$ = the interaction effect of the j^{th} reinforcement orientation group with the l^{th} sex group
$(CS)_{kl}$ = the interaction effect of the k^{th} reinforcement type-frequency group with the l^{th} sex group

b1 = the partial regression of IQ on Y
b2 = the partial regression of MA on Y
b3 = the partial regression of CA on Y
e_{ijkl} = the random error

Because of the non-orthogonality of the data, all constants were estimated by a conventional least squares analysis and all tests were made under the assumption of fixed effects (Harvey, 1960; Winer, 1962). In addition, separate analyses were made of the attainment time scores of the subjects in the major levels groups. Here, all variables were held constant except mental age, chronological age, and intelligence level.

When the F-ratio yielded by the analysis of a main effect was significant, paired comparison were employed to examine the simple effects. The technique used for these paired comparisons was the Kramer multiple range test (Harvey, 1960; Winer, 1962).

In all comparisons, the .01 probability level was the criterion for rejecting the null hypotheses related to the means. The selection of the more stringent .01 probability level rather than the .05 probability level was based on two considerations: the large numbers of degrees of freedom associated with the error terms and the large number of analyses performed. The reasoning[1] underlying this decision was briefly the following. First, the response measures were limited in precision to some extent; on the other hand, the large numbers of subjects and the statistical designs employed resulted in highly precise or powerful statistical tests. Consequently, there was a possibility that the results would reflect statistical but not practical significance. Second, since so many tests were being performed, the number of ostensibly significant statistics occurring by chance could be expected to be magnified. To attenuate the possibility of these difficulties, it was decided *a priori* to adopt a higher probability level than the .05 level which conventionally is selected as the criterion for rejecting the null hypothesis. However, since this is a stringent criterion,the tables in Chapter III include information for readers who prefer a less conservative approach. This information consists of the following: designations of statistics which occur at probability levels which are less than .05 and greater than .01; results of paired comparisons used to examine simple effects in comparisons in which main effects were associated with F-ratios which occurred between the .05 and .01 probability levels. Since this information is considered as supplementary and advisory, it is not presented or discussed in Chapters IV and V.

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[1] See Cochran and Cox (1950), Edwards (1958), Lindquist (1953), McNemar (1955), and Winer (1962) for a discussion of the issues involved here.

Consideration is given now to the analysis used for the data in the nominal scale. The directions in which the subjects altered their goals were classified into six categories: after success information--raising, lowering or not changing goals; after failure information--raising, lowering, or not changing goals. For each trial, the frequencies entered in each category were summarized for each base cell group. From trial to trial, the types of reinforcement information administered to the several groups varied; consequently, direct comparisons of all groups in terms of each category were not possible for each trial. Instead, comparisons were made only of the groups who received the same type of information. These comparisons are listed below.

1. Verbal tasks, trials 9, 10, 17, 18; non-verbal tasks, trials 3, 4, 11, 12: response of C1, C2, and C5 groups (all B and D classifications) to success information.
2. Verbal tasks, trials 9, 10, 17, 18; non-verbal tasks, trials 3, 4, 11, 12: response of C3, C4, and C5 groups (all B and D classifications) to failure information.
3. Verbal tasks, trials 11, 14, 15, 19; non-verbal tasks, trials 5, 8, 9, 13: response of C1, C2, C3, and C5 groups (all B and D classifications) to success information.
4. Verbal tasks, trials 12, 13, 16, 20; non-verbal tasks, trials 6, 7, 10, 14: response of C2, C3, C4, and C5 groups (all B and D classifications) to failure information.
5. Verbal tasks, trials 21, 22, 23; non-verbal tasks, trials 15, 16, 17: response of C1, C2, C3, C4, and C5 groups (all B and D classifications) to success information.

For each trial, the appropriate groups[1] were compared in terms of each category. The procedure was as follows: the frequencies were classified into fourfold contingency tables and evaluated in terms of the methods and minimum contrasts listed by Mainland, Herrera, and Sutcliff (1956). The contrasts between the frequencies for the C1, C2, C3, and C4 groups were compared with those listed by Mainland et.al. in Table II, "Minimum Contrasts Required in Fourfold Contingency Tables for Significance at the 1 Percent Level" (pp. 5-14). The contrasts between the frequencies for the C5 groups and the C1, C2, C3 and C4 groups and between the frequencies for any two C5 groups were compared with those listed by Mainland et.al. in Table IV, "Minimum Contrasts Required in Fourfold Contingency Tables for Significance at the 1 Percent and 5 Percent Levels--Unequal Samples Up to N=20" (pp. 15-22). Even though these statistical tests had low power, in view of the extremely large number of comparisons made, the .01 level of probability was considered the wisest choice for the criterion for significance.

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[1] The C5 groups were the level of aspiration control groups and they received no controlled reinforcement information; therefore, whether they received success or failure information was contingent upon the actual relationship between their set goal and their attained performance. As a result, some subjects received success information on a given trial while some received failure information. Thus, in any one comparison, the frequencies in these groups quite often did not equal eight. In contrast, the first four C groups received controlled reinforcement information; consequently, they always contained eight subjects.

Over the several months that the experimental data were being collected, attrition occurred to a limited extent. Consequently, it was necessary to substitute several subjects to obtain performance data for the remaining tasks. In this process, every effort was made to employ subjects who had characteristics as nearly as possible similar to the subjects for whom they were being substituted. Further analyses of the pertinent subject characteristics were not performed after each substitution. Because of the large number of original subjects in relation to the small number of substitutes, it was not expected that such analyses would yield results which would differ appreciably from those presented in Tables 1 through 6.

The performance data for these substitutes were used in the analyses of relationships among frequencies. This was not the case for the covariance analyses of relationships among means. Since these latter analyses involved IBM data processing, the mechanical difficulties involved in manipulating individual cards were judged to outweigh the usefulness of such a procedure. Accordingly, for the several tasks, a constant number of subjects was involved in the analyses of frequencies while small discrepancies occurred in the number of subjects employed in the analyses of covariance. Among the covariance analyses, these discrepancies are reflected in the differences in the degree of freedom associated with the respective total and error sums of squares and mean squares evident in the tables presented in Chapter III.

One additional comment may be helpful to the reader. In cases in which the degrees of freedom related to the F-ratios to be evaluated did not correspond to the tabled values, Lindquist's (1953) suggestion was followed. That is, the F-ratio for the nearest combination of smaller degrees of freedom was employed.

CHAPTER III

RESULTS

Statistical data reflecting the effects and interaction effects of the several reinforcement, subject, and task variables on learning performance and level of aspiration behavior are presented in this chapter. This presentation is organized in the sequence in which the statistical analyses were performed: by task, score type, and practice level. That is, within each task, the data include the following: for the attainment time and number of responses scores and for the absolute, positive, and negative goal discrepancy scores--means, results of analyses of covariance, and, where indicated, results of multiple range tests, all of which were calculated or performed at each practice level; for the numbers of times subjects changed their goals in the several directions after success and failure--results of the comparisons of frequences performed at each trial. These data are presented in tabular form; they are not reiterated verbally in the text. Instead, in Chapter IV, extant relationships are reorganized, summarized, and discussed in terms of the research objectives specified in Chapter I. The reader interested in the more technical and abstract statistical information may examine or read the tables directly for himself. For the general reader, the contents of Chapter IV will furnish information about trends apparent in the data while the contents of Chapter III will remain a reference to be consulted on specific points.

Also germane here are several comments about mechanics of presentation necessitated by the quantity of statistical material. First, the numbers in the tables are rounded by conventional procedures; the statistical analyses involved unrounded numbers. Second, symbols are employed extensively in the tables: the labels corresponding to the alphanumeric designations are those presented in the plan for analyses of results in Chapter II; the labels for the tasks are those listed in the description of the tasks in Chapter II; the labels for the statistics are those suggested and employed in standard statistics textbooks. Third, only prime statistical data are tabulated. The interested reader may compute figures not presented; e.g., an F-ratio may be obtained by dividing the mean square for a main affect by the appropriate mean square error; the sums of squares may be computed by multiplying the relevant mean squares by the associated degrees of freedom; etc. Fourth, the means are adjusted means computed within the conventional analysis of covariance framework; also, they are based on transformed scores. For these reasons, the means reflect trends and relative performance rather than specific scores attained by the groups of subjects. Fifth, the intent was to maintain consistency in the procedure and format used in presenting the results of the several statistical analyses. However, three exceptions were necessary. The first two exceptions resulted from errors made by the senior author (Blake) in transmitting directions. The first exception pertains to all six tasks. In decoding data from the IBM output sheets, decimals in certain statistical analyses were rounded to two places rather than four places, the convention chosen for this investigation for rounding numerals when listing data. However, the information presented in the tables is considered to be essentially precise. The information involved was the following: in the analyses of the attainment time scores of the B groups when the subject variables were not held constant statistically--the sums of squares and the mean squares in the analyses of covariance and all facets of the multiple range tests; in the analyses of the absolute, positive, and negative goal discrepancy scores--the sums of squares and the mean squares in the analyses of covariance. The second exception pertains to the rote learning verbal task. The procedure used for administering to the institutionalized retarded (B4) subjects the reinforcement information relevant to performance on the RLV differed from that used for the other three groups on the RLV. Consequently, although ostensibly identical, the data collected for the RLV in the original investigation and those collected in the extension were actually non-equivalent response measures. For that reason, the response measures for the institutionalized retarded (B4) group were excluded from all analyses involving data obtained on the RLV. The third exception pertains to the number of factors considered in the IBM treatment of the data, Because of the load potential of the machines used in the analyses of the attainment time measure, it was not possible to include the S, DC, BS, DS, and CS main effects in the covariance analyses of this response measure. New machines were obtained before the number of responses scores were analyzed; and so, the covariance analyses of the number of responses scores include these several main effects.

The remainder of this chapter consists of two sections: table locations and tabular presentation. These sections occur below.

Table Locations

The locations of the several tables are listed below. These locations are ordered by task and score type.

I. Discrimination learning verbal task.

   A. Relationships among attainment time scores.

      1. Means--comparisons over all B groups, Table 7.
      2. Analysis of covariance results--comparisons over all B groups, Table 8.
      3. Multiple range test results--comparisons over all B groups, Table 9.
      4. Means--comparisons within the B1 group, Table 10.
      5. Analysis of covariance results--comparisons within the B1 group, Table 11.
      6. Means--comparisons within the B2 group, Table 12.
      7. Analysis of covariance results--comparisons within the B2 group, Table 13.
      8. Means--comparisons within the B3 group, Table 14.
      9. Analysis of covariance results--comparisons within the B3 group, Table 15.
      10. Means--comparisons within the B4 group, Table 16.
      11. Analysis of covariance results--comparisons within the B4 group, Table 17.
      12. Means--comparisons of the four B groups (MA, CA, and IQ not controlled statistically), Table 18.
      13. Analysis of covariance results--comparisons of the four B groups (MA, CA, and IQ not controlled statistically), Table 19.
      14. Multiple range test results--comparisons of the four B groups (MA, CA, and IQ not controlled statistically), Table 20.

   B. Relationships among number of responses scores.

      1. Means--comparisons over all B groups, Table 21.
      2. Analysis of covariance results--comparisons over all B groups, Table 22.
      3. Multiple range test results--comparisons over all B groups, Table 23.

   C. Relationships among absolute goal discrepancy scores.

      1. Means--comparisons over all B groups, Table 24.
      2. Analysis of covariance results--comparisons over all B groups, Table 25.
      3. Multiple range test results--comparisons over all B Groups, Table 26.

   D. Relationships among positive goal discrepancy scores.

      1. Means--comparisons over all B groups, Table 27.
      2. Analysis of covariance results--comparisons over all B groups, Table 28.
      3. Multiple range test results--comparisons over all B groups, Table 29.

E. Relationships among negative goal discrepancy scores.

1. Means--comparisons over all B groups, Table 30.
2. Analysis of covariance results--comparisons over all B groups, Table 31.
3. Multiple range test results--comparisons over all B groups, Table 32.

F. Relationships among frequencies of goal changes in the several directions after success and failure, Table 33.

II. Discrimination learning non-verbal task.

A. Relationships among attainment time scores.

1. Means--comparisons over all B groups, Table 34.
2. Analysis of covariance results--comparisons over all B groups, Table 35.
3. Multiple range test results--comparisons over all B groups, Table 36.
4. Means--comparisons within the B1 group, Table 37.
5. Analysis of covariance results--comparisons within the B1 group, Table 38.
6. Means--comparisons within the B2 group, Table 39.
7. Analysis of covariance results--comparisons within the B2 group, Table 40.
8. Multiple range test results--comparison within the B2 group, Table 41.
9. Means--comparisons within the B3 group, Table 42.
10. Analysis of covariance results--comparisons within the B3 group, Table 43.
11. Means--comparisons within the B4 group, Table 44.
12. Analysis of covariance results--comparisons within the B4 group, Table 45.
13. Means--comparisons of the four B groups (MA, CA, and IQ not controlled statistically), Table 46.
14. Analysis of covariance results--comparisons of the four B groups (MA, CA, and IQ not controlled statistically), Table 47.
15. Multiple range test results--comparisons of the four B groups (MA, CA, and IQ not controlled statistically), Table 48.

B. Relationships among absolute goal discrepancy scores.

1. Means--comparisons over all B groups, Table 49.
2. Analysis of covariance results--comparisons over all B groups, Table 50.
3. Multiple range test results--comparisons over all B groups, Table 51.

C. Relationships among positive goal discrepancy scores.

1. Means--comparisons over all B groups, Table 52.
2. Analysis of covariance results--comparisons over all B groups, Table 53.
3. Multiple range test results--comparisons over all B groups, Table 54.

D. Relationships among negative goal discrepancy scores.

  1. Means--comparisons over all B groups, Table 55.
  2. Analysis of covariance results--comparisons over all B groups, Table 56.
  3. Multiple range test results--comparisons over all B groups, Table 57.

E. Relationships among frequencies of goal changes in the several directions after success and failure, Table 58.

III. Rote learning verbal task.

A. Relationships among attainment time scores.

  1. Means--comparisons over all B groups, Table 59.
  2. Analysis of covariance results--comparisons over all B groups, Table 60.
  3. Multiple range test results--comparisons over all B groups, Table 61.
  4. Means--comparisons within the B1 group, Table 62.
  5. Analysis of covariance results--comparisons within the B1 group, Table 63.
  6. Multiple range test results--comparisons within the B1 group, Table 64.
  7. Means--comparisons within the B2 group, Table 65.
  8. Analysis of covariance results--comparisons within the B2 group, Table 66.
  9. Means--comparisons within the B3 group, Table 67.
  10. Analysis of covariance results--comparisons within the B3 group, Table 68.
  11. Multiple range test results--comparisons within the B3 group, Table 69.
  12. Means--comparisons of three B groups (MA, CA, and IQ not controlled statistically), Table 70.
  13. Analysis of covariance results--comparisons of three B groups (MA, CA, and IQ not controlled statistically), Table 71.
  14. Multiple range test results--comparisons of three B groups (MA, CA, and IQ not controlled statistically), Table 72.

B. Relationships among number of responses scores.

  1. Means--comparisons over all B groups, Table 73.
  2. Analysis of covariance results--comparisons over all B groups, Table 74.
  3. Multiple range test results--comparisons over all B groups, Table 75.

C. Relationships among absolute goal discrepancy scores.

  1. Means--comparisons over all B groups, Table 76.
  2. Analysis of covariance results--comparisons over all B groups, Table 77.

D. Relationships among positive goal discrepancy scores.

  1. Means--comparisons over all B groups, Table 78.
  2. Analysis of covariance results--comparisons over all B groups, Table 79.

E. Relationships among negative goal discrepancy scores.

  1. Means--comparisons over all B groups, Table 80.
  2. Analysis of covariance results--comparisons over all B groups, Table 81.

F. Relationships among frequencies of goal changes in the several directions after success and failure, Table 82.

IV. Rote learning non-verbal task.

A. Relationships among attainment time scores.

  1. Means--comparisons over all B groups, Table 83.
  2. Analysis of covariance results--comparisons over all B groups, Table 84.
  3. Multiple range test results--comparisons over all B groups, Table 85.
  4. Means--comparisons within the B1 group, Table 86.
  5. Analysis of covariance results--comparisons within the B1 group, Table 87.
  6. Multiple range test results--comparisons within the B1 group, Table 88.
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Tabular Presentation

The tables containing the several types of statistical data are presented below. The order of presentation is that specified in the preceding section.

Table 7

Mean Attainment Time Scores: Discrimination Learning Verbal Task--Comparisons Over All B Groups

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	60.2634	38.2617	34.9230	29.5755
	B2	44.2490	32.6164	26.6317	23.9491
	B3	32.5609	20.2072	17.3629	18.2714
	B4	46.1966	30.4117	28.0210	22.9498
C	C1	45.4316	29.6026	26.2083	22.6467
	C2	51.4796	33.3267	26.9804	23.8721
	C3	44.1810	31.5479	28.3017	24.7194
	C4	40.4661	27.2930	24.1995	20.9100
	C5	45.8270	28.6585	25.5893	23.8132
	C6	47.5196	31.8170	29.1288	26.1572
D	D1	46.2422.	30.4948	26.9699	23.4209
	D2	45.3928	30.2537	26.4994	23.9520

Table 8

Results of Analyses of Covariance Among Mean Attainment Time Scores: Discrimination Learning Verbal Task--Comparisons Over All B Groups

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	373	743.9488	355.9411	287.0862	251.6169
Regression	12	2,635.0294	935.5784	780.5375	687.3613
Error	361	681.0874	336.6734	270.6834	237.1323
B	3	3,875.2016**	1,741.5453**	1.208.2899**	808.9408*
C	5	820.3624	310.6464	200.4474	197.2268
D	1	66.9537	5.4014	20.5725	26.2105
MA	1	2,131.0166	1,922.8125*	2,253.1250**	1,300.5104*
CA	1	5.8577	645.8333	1,062.9167*	542.6458
IQ	1	2,531.0707	2,688.9510**	3,605.3846***	1,926.6434**

* $P < .05$
** $P < .01$
*** $P < .001$

Table 9

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Attainment Time Scores, Discrimination Learning verbal Task--Comparisons Over all B Groups

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$Z_{.05}S$	$Z_{.01}S$	Results
B	A1	B1:B2	69.8052	76.2120	99.1800	B1=B2
		B1:B3	83.1077	78.8220	101.7900	B1>B3*
		B1:B4	123.4370	72.2970	95.0040	B1>B4**
		B2:B3	69.1483	72.2970	95.0040	B2=B3
		B2:B4	7.5427	72.2970	95.0040	B2=B4
		B3:B4	38.5671	76.2120	99.1800	B3=B4
B	A2	B1:B2	24.6073	50.8570	66.8304	B1=B2
		B1:B3	54.1636	55.4472	71.6040	B1=B3
		B1:B4	68.8838	53.6112	69.7680	B1>B4*
		B2:B3	73.4142	53.6112	69.7680	B2>B3**
		B2:B4	8.5388	50.8572	66.8304	B2=B4
		B3:B4	28.8625	50.8572	66.8304	B3=B4
B	A3	B1:B2	36.1413	48.0632	62.5480	B1=B2
		B1:B3	52.6803	49.7092	64.1940	B1>B3*
		B1:B4	60.5652	45.5942	59.9144	B1>B4**
		B2:B3	54.8347	45.5942	59.9144	B2>B3*
		B2:B4	5.3810	45.5942	59.9144	B2=B4
		B3:B4	30.1453	48.0632	62.5480	B3=B4
B	A4	B1:B2	24.5250	42.6303	56.0196	B1=B2
		B1:B3	33.9123	46.4778	60.0210	B1=B3
		B1:B4	58.1403	44.9388	58.4820	B1>B4*
		B2:B3	33.5898	44.9388	58.4820	B2=B3
		B2:B4	3.8701	42.6303	56.0196	B2=B4
		B3:B4	13.2325	42.6303	56.0196	B3=B4

* $P < .05$

** $P < .01$

Table 10

Mean Attainment Time Scores: Discrimination Learning Verbal Task--Comparisons Within the B1 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	51.4882	32.6042	28.9626	25.5447
	C2	53.6247	32.7200	28.0687	25.8922
	C3	38.9434	29.5403	25.3007	23.8329
	C4	53.4355	29.4350	28.6674	23.1321
	C5	38.0056	25.0405	21.5052	17.6564
	C6	55.9479	36.4052	30.3597	27.0011
D	D1	47.9666	29.4692	26.2653	23.3937
	D2	49.1818	32.4459	28.0227	24.2928

Table 11

Results of Analyses of Covariance Among Mean Attainment Time Scores: Discrimination Learning Verbal Task--Comparisons Within the B1 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	88	692.0206	226.5743	180.3361	140.3965
Regression	9	1,252.5764	275.0681	185.3881	180.1339
Error	79	628.1598	221.0497	179.7606	135.8694
C	5	929.3150	228.9809	155.3041	168.7365
D	1	32.1449	192.8742	67.2248	17.5954
MA	1	64.7448	0.9181	4.2580	77.8917
CA	1	1,470.0831	1,560.6709*	67.6709	1.8562
IQ	1	486.3232	44.5430	57.5119	0.5035

** P < .05

Table 12

Mean Attainment Time Scores: Discrimination Learning Verbal Task--Comparisons Within the B2 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	56.7460	36.0549	32.9137	27.7955
	C2	56.7729	44.4263	33.2675	29.1473
	C3	47.6592	32.2094	26.0275	23.8184
	C4	42.7741	30.5323	24.5567	21.9706
	C5	49.6104	31.7375	27.5294	26.0772
	C6	52.4184	34.5205	27.3298	24.3094
D	D1	49.4533	33.1324	28.0969	24.8641
	D2	52.5404	36.6946	29.1114	26.1754

Table 13

Results of Analyses of Covariance Among Mean Attainment Time Scores: Discrimination Learning Verbal Task--Comparisons Within the B2 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	95	705.1991	484.1561	261.7149	218.7445
Regression	9	665.2190	767.0089	954.4085	219.6123
Error	86	709.3830	454.5552	252.0145	218.6537
C	5	472.0677	403.5815	209.9249	113.1044
D	1	211.4463	281.5396	22.8330	38.1468
MA	1	684.8229	2,190.2957*	923.6939	615.8100
CA	1	428.0561	1,848.4454*	741.7960	485.7723
IQ	1	882.2603	2,590.8068*	1,085.1234*	705.8683

* P < .05

Table 14

Mean Attainment Time Scores: Discrimination Learning Verbal Task--Comparisons Within the B3 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	40.5014	26.5748	24.3812	22.1670
	C2	59.1818	31.5192	25.7557	23.1352
	C3	50.8664	35.2196	35.3479	30.7362
	C4	47.5599	34.5411	29.2435	25.9919
	C5	55.0513	32.0919	31.6125	32.1509
	C6	48.6810	31.0394	34.2085	31.6767
D	D1	50.5061	33.6554	30.4700	26.8123
	D2	50.1079	30.0066	29.7131	28.4737

Table 15

Results of Analyses of Covariance Among Mean Attainment Time Scores: Discrimination Learning Verbal Task--Comparisons Within the B3 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	94	891.2089	389.6204	463.8373	460.9979
Regression	9	602.6992	221.0951	528.5154	353.7546
Error	85	921.7570	407.4643	456.9891	472.3530
C	5	648.3710	147.0003	311.6098	311.7890
D	1	3.7511	314.9014	13.5494	65.2787
MA	1	97.4763	558.6150	1,475.3850	734.3650
CA	1	3.4198	304.6432	1,405.4288	759.2108
IQ	1	214.9598	583.3299	2,446.6579*	1,268.9794

* $P < .05$

Table 16

Mean Attainment Time Scores: Discrimination Learning Verbal Task--Comparisons Within the B4 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	36.3414	25.1606	19.9456	16.1600
	C2	35.9572	22.5864	19.5546	16.5175
	C3	38.9624	30.2166	27.2029	21.3800
	C4	19.6466	15.4945	14.6535	12.5420
	C5	37.7836	24.3792	21.1244	18.7451
	C6	31.0180	24.1775	23.6275	20.9870
D	D1	36.5749	25.2473	23.0474	18.7079
	D2	29.9949	22.0910	18.9887	15.7360

Table 17

Results of Analyses of Covariance Among Mean Attainment Time Scores: Discrimination Learning Verbal Task--Comparisons Within the B4 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	93	492.4369	255.9126	197.2257	132.2130
Regression	9	662.2977	322.3545	279.7493	145.5650
Error	84	474.2375	248.7938	188.3839	130.7824
C	5	815.4385	356.9630	276.9806	173.6773
D	1	1,004.0970	231.0409	382.0167	90.1778
MA	1	106.5048	213.3946	225.2664	119.4545
CA	1	253.2314	418.6314	380.8714	180.0029
IQ	1	59.1764	190.1467	224.0689	122.7467

Table 18

Mean Attainment Time Scores: Discrimination Learning Verbal Task--Comparisons of the Four B Groups (MA, CA, and IQ Not Controlled Statistically)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
	B1	48.6628	31.0781	27.2007	23.8483
	B2	50.9968	34.9134	28.6041	25.5197
	B3	50.2714	31.7830	30.0513	27.6074
	B4	33.3390	23.7223	21.0827	17.7702

Table 19

Results of Analyses of Covariance Among Mean Attainment Time Scores: Discrimination Learning Verbal Task--Comparisons of the Four B Groups (MA, CA, and IQ Not Controlled Statistically)

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	373	743.95	355.94	287.09	251.62
Regression	9	2694.37	870.04	589.21	666.07
Error	364	695.72	343.23	279.62	241.37
B	3	6603.04***	2122.76***	1467.13***	1901.40***

*** $P < .001$

Table 20

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Attainment Time Scores: Discrimination Learning Verbal Task--Comparisons of the Four B Groups (MA, CA, and IQ Not Controlled Statistically)

Variable	Level of Practice	Comparison	$\frac{(b_i - b_j) \times}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$\bar{z}_{.05}S$	$\bar{z}_{.01}S$	Results
B	A1	B1:B2	22.41	77.02	100.23	B1=B2
		B1:B3	15.33	73.06	96.01	B1=B3
		B1:B4	146.86	73.06	96.01	B1>B4**
		B2:B3	7.12	73.06	96.01	B2=B3
		B2:B4	172.36	79.66	102.87	B2>B4**
		B3:B4	166.08	77.02	100.23	B3>B4**

Table 20 (Continued)

Variable	Level of Practice	Comparison	$\frac{(b_i-b_j) \text{ x}}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$Z_{.05}S$	$Z_{.01}S$	Results
B	A2	B1:B2	36.94	54.10	70.40	B1=B2
		B1:B3	6.80	51.32	67.43	B1=B3
		B1:B4	70.50	51.32	67.43	B1>B4**
		B2:B3	30.55	51.32	67.43	B2=B3
		B2:B4	109.31	55.95	72.25	B2>B4**
		B3:B4	79.17	54.10	70.40	B3>B4**
B	A3	B1:B2	13.47	46.32	60.86	B1=B2
		B1:B3	27.30	48.83	63.54	B1=B3
		B1:B4	58.73	46.32	60.86	B1>B4*
		B2:B3	14.15	46.32	60.86	B2=B3
		B2:B4	73.49	48.83	63.54	B2>B4**
		B3:B4	88.09	50.50	65.21	B3>B4**
B	A4	B1:B2	16.07	43.03	56.55	B1=B2
		B1:B3	36.02	14.29	59.03	B1<B3*
		B1:B4	58.15	43.03	56.55	B1>B4**
		B2:B3	20.40	43.03	56.55	B2=B3
		B2:B4	75.74	14.29	59.03	B2>B4**
		B3:B4	96.53	46.92	60.59	B3>B4**

* $P < .05$
** $P < .01$

Table 21

Mean Number of Responses Scores: Discrimination Learning Verbal Task

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	57.1571	33.6509	31.4407	19.5654
	B2	53.2341	36.5857	33.7363	21.6592
	B3	45.1328	33.1683	32.7019	20.8233
	B4	59.1679	37.8056	34.5040	21.4812
C	C1	54.1506	34.9580	32.4882	20.6331
	C2	54.1160	35.3699	33.4215	20.9929
	C3	53.4509	36.6501	34.1097	21.3019
	C4	55.2680	37.8024	35.3020	21.3187
	C5	52.2391	32.4020	30.9943	20.3138
	C6	52.8134	34.6334	32.2587	20.7332
D	D1	53.6136	35.3264	33.6270	21.3037
	D2	53.7324	35.2789	32.5645	20.4608
S	S1	54.3435	36.1214	33.8520	20.9427
	S2	53.0024	34.4839	32.3395	20.8218
BC	B1C1	55.5099	34.1392	30.0939	19.1036
	B1C2	58.5679	33.8517	32.7477	21.1631
	B1C3	55.2501	33.7756	30.5590	19.5739
	B1C4	61.0327	35.6279	35.6308	20.8968
	B1C5	53.4886	29.7420	27.4709	16.3320
	B1C6	60.8124	34.7691	32.1422	20.3227
	B2C1	55.2740	35.6297	33.2761	21.4517
	B2C2	54.8950	39.7070	36.8974	23.7933
	B2C3	54.4312	38.1657	35.9633	23.8269
	B2C4	55.6417	39.2660	35.4771	21.6480
	B2C5	53.5728	35.2634	33.5916	21.9548
	B2C6	47.3089	31.4823	27.2125	17.2807
	B3C1	45.1467	33.1401	32.7400	22.1305
	B3C2	43.9262	30.5309	30.2426	18.1740
	B3C3	41.1814	32.8028	33.5924	20.7787
	B3C4	45.6869	37.4552	34.7068	21.9982
	B3C5	48.5996	32.7843	33.5050	22.7220
	B3C6	47.9749	32.2967	31.4248	19.1361

Table 21 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
BC	B4C1	48.7265	36.9229	33.8430	19.8466
	B4C2	48.0848	37.3900	33.7982	20.8411
	B4C3	51.9508	41.8562	36.3241	21.0280
	B4C4	47.7205	38.8581	35.3934	20.7319
	B4C5	42.3053	31.8183	29.4095	20.2464
	B4C6	47.0311	39.9880	38.2555	26.1931
BD	B1D1	58.0892	33.2587	30.8659	19.6742
	B2D1	51.7436	36.6435	34.5973	21.9837
	B3D1	46.2766	33.9608	33.5644	21.6265
	B4D1	47.3549	37.4425	35.4804	21.9306
	B1D2	56.2249	34.0432	32.0156	19.4565
	B2D2	54.7246	36.5278	32.8753	21.3347
	B3D2	43.9890	32.3758	31.8395	20.0210
	B4D2	49.0010	38.1686	33.5276	21.0318
BS	B1S1	59.3329	36.1377	33.2497	20.7396
	B2S1	54.3255	37.3674	33.9138	21.4818
	B3S1	44.9324	32.3310	32.7381	19.9042
	B4S1	47.7934	38.6494	35.5064	21.6450
	B1S2	54.9812	31.1641	29.6318	18.3911
	B2S2	52.1427	35.8039	33.5588	21.8366
	B3S2	45.3331	34.0056	32.6657	21.7423
	B4S2	48.5625	36.9617	33.5015	21.3173
CS	C1S1	58.0915	38.7294	35.6098	22.0618
	C2S1	53.5204	34.9954	33.5619	21.0309
	C3S1	55.7468	38.0276	37.3393	23.2266
	C4S1	54.1004	37.0983	34.4268	20.3625
	C5S1	51.0164	31.5313	29.5435	19.1018
	C6S1	55.3049	36.3464	32.6308	19.8724
	C1S2	50.2096	31.1866	29.3666	19.2044
	C2S2	54.7115	35.7444	33.2810	20.9548
	C3S2	51.1549	35.2726	30.8801	19.3771
	C4S2	56.4355	38.5066	36.1773	22.2749
	C5S2	53.4617	33.2726	32.4450	21.5258
	C6S2	53.7602	32.9204	31.8867	21.5940

Table 21 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
CD	C1D1	55.6698	36.8915	34.1128	21.5591
	C2D1	54.0212	34.3907	34.0424	21.6386
	C3D1	53.5012	36.2868	33.5949	21.4633
	C4D1	53.9509	36.1393	34.8740	20.9716
	C5D1	51.9551	32.6869	31.6358	20.9334
	C6D1	54.3025	35.5632	33.5019	21.2564
	C1D2	52.6313	33.0244	30.8636	19.7070
	C2D2	54.2107	36.3491	32.8006	20.3471
	C3D2	53.4005	37.0134	34.6244	21.1404
	C4D2	56.5851	39.4656	35.7300	21.6658
	C5D2	52.5231	32.1171	30.3527	19.6942
	C6D2	54.7626	36.9016	31.0156	20.2100

Table 22

Results of Analyses of Covariance Among Mean Number of Responses Scores: Discrimination Learning Verbal Task

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	376	2,981.3032	1,368.0798	1,236.2367	506.0080
Regression	45	24,224.1511	10,640.5844	9,393.4140	3,755.1544
Error	331	93.3027	107.4674	127.2549	64.2811
B	3	332.0583*	358.2469*	155.1421	74.1122
C	5	72.3355	210.7315	142.1297	9.6555
D	1	1.2841	0.2055	102.7168	64.6570
S	1	156.3575	233.1050	198.8798	1.2689
BC	15	182.0133*	90.3868	116.3666	87.9946
BD	3	151.2011	28.0005	118.8578	7.7512
BS	3	120.1344	158.1365	57.4609	64.5859
CD	5	50.4766	103.4335	45.4279	12.3832
CS	5	254.2513*	191.5482	226.6240	101.7846
MA	1	1,105.3684***	1,259.8267***	1,384.7293**	614.5086**
CA	1	115.7623	249.3151	279.1924	151.8163
IQ	1	704.9797**	326.6645	340.7190	174.2751

* $P < .05$

** $P < .01$

*** $P < .001$

Table 23

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Number of Responses Scores: Discrimination Learning Verbal Task

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$z_{.05}^{S}$	$z_{.01}^{S}$	Results
B	A1	B1:B2	14.6786	26.7582	35.1624	B1=B2
		B1:B3	29.4535	28.2072	36.7080	B1>B3*
		B1:B4	17.2982	26.7582	35.1624	B1=B4
		B2:B3	41.3086	26.7582	35.1624	B2>B3**
		B2:B4	19.6802	28.2072	36.7080	B2=B4
		B3:B4	31.3841	29.1732	37.6740	B3<B4*
B	A2	B1:B2	10.9810	28.7249	37.7468	B1=B2
		B1:B3	1.1821	28.7249	37.7468	B1=B3
		B1:B4	35.7395	30.2804	39.4060	B1<B4*
		B2:B3	17.4251	30.2804	39.4060	B2=B3
		B2:B4	4.0459	28.7249	37.7468	B2=B4
		B3:B4	10.3694	31.3174	40.4430	B3=B4
BC	A1	B2C6:B4C5	12.1900	26.7582	35.1624	B2C6=B4C5
		B2C6:B3C3	15.8769	28.2072	36.7080	B2C6=B3C3
		B2C6:B1C5	22.7511	29.1732	37.6740	B2C6=B1C5
		B2C6:B1C1	23.7611	29.8494	38.4468	B2C6=B1C1
		B2C6:B4C4	24.5899	30.4290	39.0264	B2C6=B4C4
		B2C6:B1C3	26.0042	30.8154	39.5094	B2C6=B1C3
		B2C6:B3C2	26.6836	31.2018	39.9924	B2C6=B3C2
		B2C6:B3C4	29.8466	31.4916	40.2822	B2C6=B3C4
		B2C6:B4C2	32.4686	31.7814	40.5720	B2C6<B4C2*
		B2C6:B3C1	32.8458	31.9746	40.8618	B2C6<B3C1*
		B2C6:B2C4	34.8158	32.2644	41.1516	B2C6<B2C4*
		B2C6:B1C2	39.5304	32.4576	41.3931	B2C6<B1C2*
		B2C6:B4C1	39.8278	32.6508	41.6346	B2C6<B4C1*
		B2C6:B2C2	36.6732	32.7474	41.8278	B2C6<B2C2*
		B2C6:B2C3	37.5956	32.9406	41.9244	B2C6<B2C3*
		B2C6:B2C1	38.2511	33.1338	42.1176	B2C6<B2C1*
		B2C6:B2C5	39.2150	33.2304	42.3108	B2C6<B2C5*
		B2C6:B1C4	46.2244	33.3270	42.4074	B2C6<B1C4**
		B2C6:B1C6	41.7605	33.5202	42.6006	B2C6<B1C6*
		B2C6:B4C3	56.0132	33.5202	42.6006	B2C6<B4C3**
		B2C6:B3C5	60.7200	33.5202	42.6006	B2C6<B3C5**
		B2C6:B4C6	53.0085	33.5202	42.6006	B2C6<B4C6**
		B2C6:B3C6	80.9392	33.5202	42.6006	B2C6<B3C6**
		B4C5:B3C3	3.6870	26.7582	35.1624	B4C5=B3C3
		B4C5:B1C5	9.0884	28.2072	36.7080	B4C5=B1C5
		B4C5:B1C1	11.5701	29.1732	37.6740	B4C5=B1C1
		B4C5:B4C4	10.9356	29.8494	38.4468	B4C5=B4C4
		B4C5:B1C3	14.0423	30.4290	39.0264	B4C5=B1C3
		B4C5:B3C2	14.2225	30.8154	39.5094	B4C5=B3C2
		B4C5:B3C4	17.3264	31.2018	39.9924	B4C5=B3C4
		B4C5:B4C2	17.4527	31.4916	40.2822	B4C5=B4C2
		B4C5:B3C1	20.2694	31.7814	40.5720	B4C5=B3C1
		B4C5:B2C4	26.7772	31.9746	40.8618	B4C5=B2C4

Table 23 (Continued)

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$z_{.05}S$	$z_{.01}S$	Results
BC	A1 (Continued)	B4C5:B1C2	27.5684	32.2644	41.1516	B4C5=B1C2
		B4C5:B4C1	24.4398	32.4576	41.3931	B4C5=B4C1
		B4C5:B2C2	28.8438	32.6508	41.6346	B4C5=B2C2
		B4C5:B2C3	29.8702	32.7474	41.8278	B4C5=B2C3
		B4C5:B2C1	30.5996	32.9406	41.9244	B4C5=B2C1
		B4C5:B2C5	27.0750	33.1338	42.1176	B4C5=B2C5
		B4C5:B1C4	34.2625	33.2304	42.3108	B4C5<B1C4*
		B4C5:B1C6	37.5923	33.3270	42.4074	B4C5<B1C6*
		B4C5:B4C3	37.7164	33.5202	42.6006	B4C5<B4C3*
		B4C5:B3C5	40.7101	33.5202	42.6006	B4C5<B3C5*
		B4C5:B4C6	44.9784	33.5202	42.6006	B4C5<B4C6**
		B4C5:B3C6	84.2968	33.5202	42.6006	B4C5<B3C6**
		B3C3:B1C5	7.4736	26.7582	35.1624	B3C3=B1C5
		B3C3:B1C1	8.0223	28.2072	36.7080	B3C3=B1C1
		B3C3:B4C4	8.7129	29.1732	37.6740	B3C3=B4C4
		B3C3:B1C3	8.6735	29.8494	38.4468	B3C3=B1C3
		B3C3:B3C2	9.5305	30.4290	39.0264	B3C3=B3C2
		B3C3:B3C4	12.3200	30.8154	39.5094	B3C3=B3C4
		B3C3:B4C2	16.2813	31.2018	39.9924	B3C3=B4C2
		B3C3:B3C1	14.9651	31.4916	40.2822	B3C3=B3C1
		B3C3:B2C4	23.6007	31.7814	40.5720	B3C3=B2C4
		B3C3:B1C2	23.9504	31.9746	40.8618	B3C3=B1C2
		B3C3:B4C1	24.2478	32.2644	41.1516	B3C3=B4C1
		B3C3:B2C2	25.7067	32.4576	41.3931	B3C3=B2C2
		B3C3:B2C3	22.4418	32.6508	41.6346	B3C3=B2C3
		B3C3:B2C1	27.4959	32.7474	41.8278	B3C3=B2C1
		B3C3:B2C5	28.5889	32.9406	41.9244	B3C3=B2C5
		B3C3:B1C4	30.6445	33.1338	42.1176	B3C3=B1C4
		B3C3:B1C6	33.9053	33.2304	42.3108	B3C3<B1C6*
		B3C3:B4C3	33.6688	33.3270	42.4074	B3C3<B4C3*
		B3C3:B3C5	39.5477	33.5202	42.6006	B3C3<B3C5*
		B3C3:B4C6	47.3139	33.5202	42.6006	B3C3<B4C6**
		B3C3:B3C6	71.0909	33.5202	42.6006	B3C3<B3C6**
		B1C1:B1C5	0.4656	26.7582	35.1624	B1C5=B1C1
		B1C5:B4C4	0.9103	28.2072	36.7080	B1C5=B4C4
		B1C5:B1C3	2.3959	29.1732	37.6740	B1C5=B1C3
		B1C5:B3C2	2.9250	29.8494	38.4468	B1C5=B3C2
		B1C5:B3C4	5.9686	30.4290	39.0264	B1C5=B3C4
		B1C5:B4C2	8.4915	30.8154	39.5094	B1C5=B4C2
		B1C5:B3C1	8.8545	31.2018	39.9924	B1C5=B3C1
		B1C5:B2C4	15.2359	31.4916	40.2822	B1C5=B2C4
		B1C5:B1C2	13.9588	31.7814	40.5720	B1C5=B1C2
		B1C5:B4C1	16.3035	31.9746	40.8618	B1C5=B4C1
		B1C5:B2C2	17.2625	32.2644	41.1516	B1C5=B2C2
		B1C5:B2C3	18.2689	32.4576	41.3931	B1C5=B2C3
		B1C5:B2C1	18.9841	32.6508	41.6346	B1C5=B2C1
		B1C5:B2C5	16.5220	32.7474	41.8278	B1C5=B2C5
		B1C5:B1C4	19.6812	32.9406	41.9244	B1C5=B1C4
		B1C5:B1C6	21.9266	33.1338	42.1176	B1C5=B1C6
		B1C5:B4C3	31.1472	33.2304	42.3108	B1C5=B4C3
		B1C5:B3C5	29.4194	33.3270	42.4074	B1C5=B3C5

Table 23 (Continued)

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$\bar{z}_{.05}S$	$\bar{z}_{.01}S$	Results
		B1C5:B4C6	38.0538	33.5202	42.6006	B1C5<B4C6*
		B1C5:B3C6	70.0925	33.5202	42.6006	B1C5<B3C6**
		B1C1:B4C4	0.3688	26.7582	35.1624	B1C1=B4C4
		B1C1:B1C3	1.9176	28.2072	36.7080	B1C1=B1C3
		B1C1:B3C2	2.3763	29.1732	37.6740	B1C1=B3C2
		B1C1:B3C4	5.5272	29.8494	38.4468	B1C1=B3C4
		B1C1:B4C2	7.9429	30.4290	39.0264	B1C1=B4C2
		B1C1:B3C1	7.0477	30.8154	39.5094	B1C1=B3C1
		B1C1:B2C4	14.9781	31.2018	39.9924	B1C1=B2C4
		B1C1:B1C2	13.4804	31.4916	40.2822	B1C1=B1C2
		B1C1:B4C1	12.9917	31.7814	40.5720	B1C1=B4C1
		B1C1:B2C2	17.0447	31.9746	40.8618	B1C1=B2C2
		B1C1:B2C3	17.7202	32.2644	41.1516	B1C1=B2C3
		B1C1:B2C1	15.6428	32.4576	41.3931	B1C1=B2C1
		B1C1:B2C5	19.8730	32.6508	41.6346	B1C1=B2C5
		B1C1:B1C4	19.2029	32.7474	41.8278	B1C1=B1C4
		B1C1:B1C6	22.0052	32.9406	41.9244	B1C1=B1C6
		B1C1:B4C3	31.2044	33.1338	42.1176	B1C1=B4C3
		B1C1:B3C5	35.8231	33.2304	42.3108	B1C1<B3C5*
		B1C1:B4C6	38.2477	33.3220	42.4074	B1C1<B4C6*
		B1C1:B3C6	70.9208	33.5202	42.6006	B1C1<B3C6**
		B4C4:B1C3	1.8743	26.7582	35.1624	B4C4=B1C3
		B4C4:B3C2	2.0937	28.2072	36.7080	B4C4=B3C2
BC	A1	B4C4:B3C4	4.4097	29.1732	37.6740	B4C4=B3C4
(Continued)		B4C4:B4C2	6.9483	29.8494	38.4468	B4C4=B4C2
		B4C4:B3C1	8.2559	30.4290	39.0264	B4C4=B3C1
		B4C4:B2C4	12.4888	30.8154	39.5094	B4C4=B2C4
		B4C4:B1C2	15.4005	31.2018	39.9924	B4C4=B1C2
		B4C4:B4C1	13.7679	31.4916	40.2822	B4C4=B4C1
		B4C4:B2C2	16.9938	31.7814	40.5720	B4C4=B2C2
		B4C4:B2C3	18.0397	31.9746	40.8618	B4C4=B2C3
		B4C4:B2C1	18.7830	32.2644	41.1516	B4C4=B2C1
		B4C4:B2C5	19.8760	32.4576	41.3931	B4C4=B2C5
		B4C4:B1C4	18.3837	32.6508	41.6346	B4C4=B1C4
		B4C4:B1C6	25.1924	32.7474	41.8278	B4C4=B1C6
		B4C4:B4C3	27.7127	32.9406	41.9244	B4C4=B4C3
		B4C4:B3C5	36.1302	33.1338	42.1176	B4C4<B3C5*
		B4C4:B4C6	34.0427	33.2304	42.3108	B4C4<B4C6*
		B4C4:B3C6	71.8969	33.3270	42.4074	B4C4<B3C6**
		B1C3:B3C2	0.1802	26.7582	35.1624	B1C3=B3C2
		B1C3:B3C4	3.2841	28.2072	36.7080	B1C3=B3C4
		B1C3:B4C2	5.8570	29.1732	37.6740	B1C3=B4C2
		B1C3:B3C1	6.2272	29.8494	38.4468	B1C3=B3C1
		B1C3:B2C4	12.7349	30.4290	39.0264	B1C3=B2C4
		B1C3:B1C2	11.8631	30.8154	39.5094	B1C3=B1C2
		B1C3:B4C1	13.8235	31.2018	39.9924	B1C3=B4C1
		B1C3:B2C2	14.8015	31.4916	40.2822	B1C3=B2C2
		B1C3:B2C3	13.1695	31.7814	40.5720	B1C3=B2C3

Table 23 (Continued)

Variable	Level of Practice	Comparison	$\frac{(b_i-b_j)\ x}{\sqrt{2/}c_{ii}+c_{jj}-2c_{ij}}$	$\tilde{a}_{.05}S$	$\tilde{a}_{.01}S$	Results
		B1C3:B2C1	16.5573	31.9746	40.8618	B1C3=B2C1
		B1C3:B2C5	17.6298	32.2644	41.1516	B1C3=B2C5
		B1C3:B1C4	17.7342	32.4576	41.3931	B1C3=B1C4
		B1C3:B1C6	20.0379	32.6508	41.6346	B1C3=B1C6
		B1C3:B4C3	24.0970	32.7474	41.8278	B1C3=B4C3
		B1C3:B3C5	34.2201	32.9406	41.9244	B1C3<B3C5*
		B1C3:B4C6	36.0045	33.1338	42.1176	B1C3<B4C6*
		B1C3:B3C6	68.6777	33.2304	42.3108	B1C3<B3C6**
		B3C2:B3C4	2.7895	26.7582	35.1624	B3C2=B3C4
		B3C2:B4C2	4.7233	28.2072	36.7080	B3C2=B4C2
		B3C2:B3C1	5.4346	29.1732	37.6740	B3C2=B3C1
		B3C2:B2C4	12.7940	29.8494	38.4468	B3C2=B2C4
		B3C2:B1C2	11.1044	30.4290	39.0264	B3C2=B1C2
		B3C2:B4C1	13.6433	30.8154	39.5094	B3C2=B4C1
		B3C2:B2C2	12.4991	31.2018	39.9924	B3C2=B2C2
		B3C2:B2C3	15.9460	31.4916	40.2822	B3C2=B2C3
		B3C2:B2C1	16.6893	31.7814	40.5720	B3C2=B2C1
		B3C2:B2C5	17.7823	31.9746	40.8618	B3C2=B2C5
		B3C2:B1C4	20.0400	32.2644	41.1516	B3C2=B1C4
		B3C2:B1C6	23.0987	32.4576	41.3931	B3C2=B1C6
		B3C2:B4C3	29.3296	32.6508	41.6346	B3C2=B4C3
		B3C2:B3C5	30.0172	32.7474	41.8278	B3C2=B3C5
		B3C2:B4C6	36.5073	32.9406	41.9244	B3C2<B4C6*
		B3C2:B3C6	61.5604	33.1338	42.1176	B3C2<B3C6**
BC	A1	B3C4:B4C2	2.5729	26.7582	35.1624	B3C4=B4C2
(Continued)		B3C4:B3C1	2.6450	28.2072	36.7080	B3C4=B3C1
		B3C4:B2C4	8.0791	29.1732	37.6740	B3C4=B2C4
		B3C4:B1C2	10.2421	29.8494	38.4468	B3C4=B1C2
		B3C4:B4C1	10.5395	30.4290	39.0264	B3C4=B4C1
		B3C4:B2C2	11.7370	30.8154	39.5094	B3C4=B2C2
		B3C4:B2C3	12.5438	31.2018	39.9924	B3C4=B2C3
		B3C4:B2C1	[illegible]	[illegible]	[illegible]	[illegible]
		B3C4:B2C5	14.6192	31.7814	40.5720	B3C4=B2C5
		B3C4:B1C4	14.0916	31.9746	40.8618	B3C4=B1C4
		B3C4:B1C6	19.5627	32.2644	41.1516	B3C4=B1C6
		B3C4:B4C3	26.1666	32.4576	41.3931	B3C4=B4C3
		B3C4:B3C5	27.2277	32.6508	41.6346	B3C4=B3C5
		B3C4:B4C6	33.3442	32.7474	41.8278	B3C4<B4C6*
		B3C4:B3C6	58.7709	32.9406	41.9244	B3C4<B3C6**
		B4C2:B3C1	0.3702	26.7582	35.1624	B4C2=B3C1
		B4C2:B2C4	6.8779	28.2072	36.7080	B4C2=B2C4
		B4C2:B1C2	6.3811	29.1732	37.6740	B4C2=B1C2
		B4C2:B4C1	6.9871	29.8494	38.4468	B4C2=B4C1
		B4C2:B2C2	7.4423	30.4290	39.0264	B4C2=B2C2
		B4C2:B2C3	9.9709	30.8154	39.5094	B4C2=B2C3
		B4C2:B2C1	10.7003	31.2018	39.9924	B4C2=B2C1
		B4C2:B2C5	11.7729	31.4916	40.2822	B4C2=B2C5
		B4C2:B1C4	14.3632	31.7814	40.5720	B4C2=B1C4

Table 23 (Continued)

Variable	Level of Practice	Comparison	$\frac{(b_i-b_j)}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$\bar{\bar{s}}_{.05}S$	$\bar{\bar{s}}_{.01}S$	Results
BC (Continued)	A1	B4C2:B1C6	16.9898	31.9746	40.8618	B4C2=B1C6
		B4C2:B4C3	20.2637	32.2644	41.1516	B4C2=B4C3
		B4C2:B3C5	27.7230	32.4576	41.3931	B4C2=B3C5
		B4C2:B4C6	26.4411	32.6508	41.6346	B4C2=B4C6
		B4C2:B3C6	64.0182	32.7474	41.8278	B4C2<B3C6**
		B3C1:B2C4	6.6318	26.7582	35.1624	B3C1=B2C4
		B3C1:B1C2	7.2990	28.2072	36.7080	B3C1=B1C2
		B3C1:B4C1	6.4938	29.1732	37.6740	B3C1=B4C1
		B3C1:B2C2	8.7378	29.8494	38.4468	B3C1=B2C2
		B3C1:B2C3	9.7838	30.4290	39.0264	B3C1=B2C3
		B3C1:B2C1	8.8307	30.8154	39.5094	B3C1=B2C1
		B3C1:B2C5	11.4027	31.2018	39.9924	B3C1=B2C5
		B3C1:B1C4	13.9930	31.4916	40.2822	B3C1=B1C4
		B3C1:B1C6	16.9364	31.7814	40.5720	B3C1=B1C6
		B3C1:B4C3	22.7340	31.9746	40.8618	B3C1=B4C3
		B3C1:B3C5	24.5827	32.2644	41.1516	B3C1=B3C5
		B3C1:B4C6	30.3450	32.4576	41.3931	B3C1=B4C6
		B3C1:B3C6	56.1259	32.6508	41.6346	B3C1<B3C6**
		B2C4:B1C2	0.7912	26.7582	35.1624	B2C4=B1C2
		B2C4:B4C1	1.0886	28.2072	36.7080	B2C4=B4C1
		B2C4:B2C2	1.8573	29.1732	37.6740	B2C4=B2C2
		B2C4:B2C3	2.7798	29.8494	38.4468	B2C4=B2C3
		B2C4:B2C1	3.4353	30.4290	39.0264	B2C4=B2C1
		B2C4:B2C5	4.3992	30.8154	39.5094	B2C4=B2C5
		B2C4:B1C4	6.2281	31.2018	39.9924	B2C4=B1C4
		B2C4:B1C6	10.3046	31.4916	40.2822	B2C4=B1C6
		B2C4:B4C3	16.5356	31.7814	40.5720	B2C4=B4C3
		B2C4:B3C5	21.2424	31.9746	40.8618	B2C4=B3C5
		B2C4:B4C6	23.7132	32.2644	41.1516	B2C4=B4C6
		B2C4:B3C6	57.0092	32.4576	41.3931	B2C4<B3C6**
		B1C2:B2C2	1.0812	28.2072	36.7080	B1C2=[illegible]
		B1C2:B2C3	2.3018	29.1732	37.6740	B1C2=B2C3
		B1C2:B2C1	3.0312	29.8494	38.4468	B1C2=B2C1
		B1C2:B2C5	4.1037	30.4290	39.0264	B1C2=B2C5
		B1C2:B1C4	5.8711	30.8154	39.5094	B1C2=B1C4
		B1C2:B1C6	8.1747	31.2018	39.9924	B1C2=B1C6
		B1C2:B4C3	15.4351	31.4916	40.2822	B1C2=B4C3
		B1C2:B3C5	20.0539	31.7814	40.5720	B1C2=B3C5
		B1C2:B4C6	22.4784	31.9746	40.8618	B1C2=B4C6
		B1C2:B3C6	55.1515	32.2644	41.1516	B1C2<B3C6**
		B4C1:B2C2	0.9780	26.7582	35.1624	B4C1=B2C2
		B4C1:B2C3	2.0044	28.2072	36.7080	B4C1=B2C3
		B4C1:B2C1	2.2746	29.1732	37.6740	B4C1=B2C1
		B4C1:B2C5	3.8063	29.8494	38.4468	B4C1=B2C5
		B4C1:B1C4	6.3966	30.4290	39.0264	B4C1=B1C4
		B4C1:B1C6	9.0232	30.8154	39.5094	B4C1=B1C6
		B4C1:B4C3	13.2765	31.2018	39.9924	B4C1=B4C3

Table 23 (Continued)

Variable	Level of Practice	Comparison	$\frac{(\bar{b}_i-\bar{b}_j)\, x^{\cdot\cdot}}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$Z_{.05}S$	$Z_{.01}S$	Results
BC (Continued)	A1	B4C1:B3C5	19.7564	31.4916	40.2822	B4C1=B3C5
		B4C1:B4C6	19.9346	31.7814	40.5720	B4C1=B4C6
		B4C1:B3C6	54.8541	31.9746	40.8618	B4C1<B3C6**
		B2C2:B2C3	0.9224	26.7582	35.1624	B2C2=B2C3
		B2C2:B2C1	1.5779	28.2072	36.7080	B2C2=B2C1
		B2C2:B2C5	2.5419	29.1732	37.6740	B2C2=B2C5
		B2C2:B1C4	5.4187	29.8494	38.4468	B2C2=B1C4
		B2C2:B1C6	8.1986	30.4290	39.0264	B2C2=B1C6
		B2C2:B4C3	14.4296	30.8154	39.5094	B2C2=B4C3
		B2C2:B3C5	19.1364	31.2018	39.9924	B2C2=B3C5
		B2C2:B4C6	21.6072	31.4916	40.2822	B2C2=B4C6
		B2C2:B3C6	54.9032	31.7814	40.5720	B2C2<B3C6**
		B2C3:B2C1	0.6555	26.7582	35.1624	B2C3=B2C1
		B2C3:B2C5	1.6194	28.2072	36.7080	B2C3=B2C5
		B2C3:B1C4	4.3923	29.1732	37.6740	B2C3=B1C4
		B2C3:B1C6	7.1527	29.8494	38.4468	B2C3=B1C6
		B2C3:B4C3	11.2270	30.4290	39.0264	B2C3=B4C3
		B2C3:B3C5	18.0905	30.8154	39.5094	B2C3=B3C5
		B2C3:B4C6	20.5613	31.2018	39.9924	B2C3=B4C6
		B2C3:B3C6	53.8572	31.4916	40.2822	B2C3<B3C6**
		B2C1:B2C5	0.9639	26.7582	35.1624	B2C1=B2C5
		B2C1:B1C4	3.6629	28.2072	36.7080	B2C1=B1C4
		B2C1:B1C6	6.4094	29.1732	37.6740	B2C1=B1C6
		B2C1:B4C3	12.4039	29.8494	38.4468	B2C1=B4C3
		B2C1:B3C5	17.3472	30.4290	39.0264	B2C1=B3C5
		B2C1:B4C6	19.8180	30.8154	39.5094	B2C1=B4C6
		B2C1:B3C6	53.1139	31.2018	39.9924	B2C1<B3C6**
		B2C5:B1C4	2.5903	26.7582	35.1624	B2C5=B1C4
		B2C5:B1C6	5.3164	28.2072	36.7080	B2C5=B1C6
		B2C5:B4C3	11.3314	29.1732	37.6740	B2C5=B4C3
		B2C5:B3C5	13.6350	29.8494	38.4468	B2C5=B3C5
		B2C5:B3C6	52.0209	30.8154	39.5094	B2C5<B3C6**
		B1C4:B1C6	2.3606	26.7582	35.1624	B1C4=B1C6
		B1C4:B4C3	8.7410	28.2072	36.7080	B1C4=B4C3
		B1C4:B3C5	13.3598	29.1732	37.6740	B1C4=B3C5
		B1C4:B4C6	15.7844	29.8494	38.4468	B1C4=B4C6
		B1C4:B3C6	48.4575	30.4290	39.0264	B1C4<B3C6**
		B1C6:B4C3	6.1144	26.7582	35.1624	B1C6=B4C3
		B1C6:B3C5	10.9378	28.2072	36.7080	B1C6=B3C5
		B1C6:B4C6	11.2480	29.1732	37.6740	B1C6=B4C6
		B1C6:B3C6	39.1787	29.8494	38.4468	B1C6<B3C6**
		B4C3:B3C5	4.6188	26.7582	35.1624	B4C3=B3C5
		B4C3:B4C6	6.3300	28.2072	36.7080	B4C3=B4C6
		B4C3:B3C6	40.4736	29.1732	37.6740	B4C3<B3C6**
		B3C5:B4C6	2.4708	26.7582	35.1624	B3C5=B4C6
		B3C5:B3C6	31.5432	28.2072	36.7080	B3C5<B3C6*
		B4C6:B3C6	27.9307	26.7580	35.1624	B4C6<B3C6*

Table 23 (Continued)

Vari-able	Level of Practice	Compari-son	$\overline{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}(b_i-b_j) \times$	$z_{.05}S$	$z_{.01}S$	Results
CS	A1	C1S2:C5S1	12.7708	26.7582	35.1624	C1S2=C5S1
		C1S2:C4S1	13.3591	28.2072	36.7080	C1S2=C4S1
		C1S2:C3S2	12.4193	29.1732	37.6740	C1S2=C3S2
		C1S2:C2S1	18.8011	29.8494	38.4468	C1S2=C2S1
		C1S2:C6S2	24.5438	30.4290	39.0264	C1S2=C6S2
		C1S2:C6S1	31.8124	30.8154	39.5094	C1S2<C6S1*
		C1S2:C2S2	34.5488	31.2018	39.9924	C1S2<C2S2*
		C1S2:C3S1	45.6642	31.4916	40.2822	C1S2<C3S1**
		C1S2:C4S2	39.2384	31.7814	40.5720	C1S2<C4S2*
		C1S2:C5S2	38.9839	31.9746	40.8618	C1S2<C5S2*
		C1S2:C1S1	38.6953	32.2644	41.1516	C1S2<C1S1*
		C5S1:C4S1	0.4162	26.7582	35.1624	C5S1=C4S1
		C5S1:C3S2	2.4985	28.2072	36.7080	C5S1=C3S2
		C5S1:C2S1	4.7345	29.1732	37.6740	C5S1=C2S1
		C5S1:C6S2	16.7098	29.8494	38.4468	C5S1=C6S2
		C5S1:C6S1	15.3237	30.4290	39.0264	C5S1=C6S1
		C5S1:C2S2	29.2986	30.8154	39.5094	C5S1=C2S2
		C5S1:C3S1	26.3307	31.2018	39.9924	C5S1=C3S1
		C5S1:C4S2	34.6029	31.4916	40.2822	C5S1<C4S2*
		C5S1:C5S2	22.0788	31.7814	40.5720	C5S1=C5S2
		C5S1:C1S1	38.9839	31.9746	40.8618	C5S1<C1S1*
		C4S1:C3S2	1.9843	26.7582	35.1624	C4S1=C3S2
		C4S1:C2S1	4.3560	28.2072	36.7080	C4S1=C2S1
		C4S1:C6S2	16.3806	29.1732	37.6740	C4S1=C6S2
		C4S1:C6S1	15.0262	29.8494	38.4468	C4S1=C6S1
		C4S1:C2S2	29.1202	30.4290	39.0264	C4S1=C2S2
		C4S1:C3S1	26.1484	30.8154	39.5094	C4S1=C3S1
		C4S1:C4S2	21.7488	31.2018	39.9924	C4S1=C4S2
		C4S1:C5S2	34.6029	31.4916	40.2822	C4S1<C5S2*
		C4S1:C1S1	39.2384	31.7814	40.5720	C4S1<C1S1*
		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		C3S2:C6S2	11.7029	28.2072	36.7080	C3S2=C6S2
		C3S2:C6S1	16.1095	29.1732	37.6740	C3S2=C6S1
		C3S2:C2S2	22.0210	29.8494	38.4468	C3S2=C2S2
		C3S2:C3S1	24.5423	30.4290	39.0264	C3S2=C3S1
		C3S2:C4S2	26.1484	30.8154	39.5094	C3S2=C4S2
		C3S2:C5S2	26.3307	31.2018	39.9924	C3S2=C5S2
		C3S2:C1S1	45.6642	31.4916	40.2822	C3S2<C1S1**
		C2S1:C6S2	10.9847	26.7582	35.1624	C2S1=C6S2
		C2S1:C6S1	10.5957	28.2072	36.7080	C2S1=C6S1
		C2S1:C2S2	14.9811	29.1732	37.6740	C2S1=C2S2
		C2S1:C3S1	22.0210	29.8494	38.4468	C2S1=C3S1
		C2S1:C4S2	29.1202	30.4290	39.0264	C2S1=C4S2
		C2S1:C5S2	29.2986	30.8154	39.5094	C2S1=C5S2
		C2S1:C1S1	34.5488	31.2018	39.9924	C2S1<C1S1*
		C6S2:C6S1	1.2211	26.7582	35.1624	C6S2=C6S1
		C6S2:C2S2	10.5957	28.2072	36.7080	C6S2=C2S2
		C6S2:C3S1	16.1095	29.1732	37.6740	C6S2=C3S1

Table 23 (Continued)

Variable	Level of Practice	Comparison	$(b_i - b_j) \times \sqrt{27c_{ii} + c_{jj} - 2c_{ij}}$	$\hat{Z}_{.05}S$	$\hat{Z}_{.01}S$	Results
CS	A1	C6S2:C4S2	15.0262	29.8494	38.4468	C6S2=C4S2
		C6S2:C5S2	15.3237	30.4290	39.0264	C6S2=C5S2
		C6S2:C1S1	31.8124	30.8154	39.5094	C6S2<C1S1*
		C6S1:C2S2	10.9847	26.7582	35.1624	C6S1=C2S2
		C6S1:C3S1	11.7029	28.2072	36.7080	C6S1=C3S1
		C6S1:C4S2	16.3806	29.1732	37.6740	C6S1=C4S2
		C6S1:C5S2	16.7098	29.8494	38.4468	C6S1=C5S2
		C6S1:C1S1	24.5438	30.4290	39.0264	C6S1=C1S1
		C2S2:C3S1	3.3314	26.7582	35.1624	C2S2=C3S1
		C2S2:C4S2	4.3560	28.2072	36.7080	C2S2=C4S2
		C2S2:C5S2	4.7345	29.1732	37.6740	C2S2=C5S2
		C2S2:C1S1	18.8011	29.8494	38.4468	C2S2=C1S1
		C3S1:C4S2	1.9843	26.7582	35.1624	C3S1=C4S2
		C3S1:C5S2	2.4985	28.2072	36.7080	C3S1=C5S2
		C3S1:C1S1	12.4193	29.1732	37.6740	C3S1=C1S1
		C4S2:C5S2	0.4162	26.7582	35.1624	C4S2=C5S2
		C4S2:C1S1	13.3591	28.2072	36.7080	C4S2=C1S1
		C5S2:C1S1	12.7708	26.7582	35.1624	C5S2=C1S1

* $P < .05$
** $P < .01$

Table 24

Mean Absolute Goal Discrepancy Scores:
Discrimination Learning Verbal Task

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	9.2520	35.3003	68.5161	33.5518
	B2	5.2078	23.3895	12.8146	3.7635
	B3	1.9761	16.4486	- 5.9637	- 6.1101
	B4	6.4033	23.1099	58.9637	33.0728
C	C1	4.3365	21.0177	29.2299	12.7636
	C2	6.2267	20.5202	21.6332	10.7764
	C3	3.9095	20.6060	23.3416	10.9380
	C4	5.8887	28.7957	60.9495	32.3131
	C5	8.1876	31.8714	32.9643	13.5564
D	D1	5.3269	25.7731	30.7660	11.6215
	D2	6.0927	23.3513	36.4814	20.5175
S	S1	6.3232	27.4498	32.2973	14.2304
	S2	5.0964	21.6746	34.9501	17.9086
BC	B1C1	6.9712	40.9892	88.4998	36.3213
	B1C2	8.4230	28.3375	57.3013	31.8171
	B1C3	7.4278	29.1208	51.7457	27.0624
	B1C4	8.0658	32.0230	67.8733	34.2141
	B1C5	15.3722	46.0335	77.1604	38.3441
	B2C1	3.7329	15.2836	10.4326	7.8376
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	B2C3	0.8920	16.4322	17.2742	5.4464
	B2C4	5.7249	29.2778	26.1577	1.0490
	B2C5	8.3156	33.9268	6.9675	4.5619
	B3C1	0.0605	5.9045	- 41.4301	- 24.8286
	B3C2	3.5870	11.1741	- 28.8959	- 20.7715
	B3C3	1.2232	12.5298	- 33.9417	- 22.2532
	B3C4	3.8626	26.8716	86.0873	55.6429
	B3C5	1.1472	25.7630	- 10.8676	- 18.3401
	B4C1	6.5814	21.8935	59.4173	31.7241
	B4C2	5.5232	20.5421	54.8863	32.1374
	B4C3	6.0950	24.3412	58.2882	33.4964
	B4C4	5.9015	27.0104	63.6798	38.3464
	B4C5	7.9154	21.7623	58.5968	29.6597

Table 24(Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
BD	B1D1	7.0963	34.5346	70.6749	34.2448
	B2D1	4.5230	26.3539	10.0736	3.1147
	B3D1	2.6083	17.7766	-15.7407	-22.7124
	B4D1	7.0800	24.4273	58.0562	31.8389
	B1D2	11.4077	36.0670	66.3573	32.8588
	B2D2	5.8926	20.4251	15.5556	4.4123
	B3D2	1.3439	15.1206	4.1215	10.4922
	B4D2	5.7266	21.7925	59.8912	34.3067
BS	B1S1	10.3044	40.4499	79.3236	37.6000
	B2S1	6.1469	28.1948	12.1565	4.6837
	B3S1	2.4101	16.1250	-23.3933	-20.5382
	B4S1	6.4313	25.0295	61.1025	35.1761
	B1S2	8.1996	30.1517	57.7086	29.5036
	B2S2	4.2687	18.5842	13.4727	2.8433
	B3S2	1.5421	16.7722	11.7741	8.3180
	B4S2	6.3751	21.1903	56.8450	30.9695
CD	C1D1	3.1589	23.5978	35.4199	13.6270
	C2D1	6.7556	19.5077	19.4552	7.7230
	C3D1	3.7263	24.1389	29.9045	13.9841
	C4D1	6.7985	32.8692	45.0463	10.5055
	C5D1	6.1952	28.7519	24.0041	12.2679
	C1D2	[illegible]	[illegible]	[illegible]	[illegible]
	C2D2	5.6978	21.5327	23.8112	13.8298
	C3D2	4.0927	17.0731	16.7787	7.8919
	C4D2	4.9739	24.7222	76.8527	54.1207
	C5D2	10.1800	34.9909	41.9245	14.8449
CS	C1S1	4.5232	24.3678	37.3020	15.2361
	C2S1	7.0212	19.2846	23.6978	13.6107
	C3S1	3.5696	19.4597	26.9107	12.7621
	C4S1	6.8994	34.1465	36.2386	13.0826
	C5S1	9.6026	39.9904	37.2374	16.4605
	C1S2	4.1498	17.6676	21.1578	10.2911
	C2S2	5.4322	21.7558	19.5686	7.9421
	C3S2	4.2494	21.7523	19.7725	9.1139
	C4S2	4.8780	23.4449	85.6104	51.5436
	C5S2	6.7726	23.7524	28.6412	10.6523

Table 24 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
DS	D1S1	5.9815	30.9225	36.6736	14.6971
	D2S1	6.7471	22.7255	42.3890	23.5931
	D1S2	4.6725	20.6237	24.8584	8.5459
	D2S2	5.4381	18.2019	30.5738	17.4419

Table 25

Results of Analyses of Covariance Among Mean Absolute Goal Discrepancy Scores: Discrimination Learning Verbal Task

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	311	110.94	1,218.16	9,144.21	5,861.44
Regression	39	360.87	5,746.28	19,918.82	7,687.04
Error	272	75.10	568.91	7,599.32	5,599.68
B	3	140.89	1,973.22*	7,310.21	1,735.85
C	4	173.06	1,731.07*	15,398.85	5,106.68
D	1	44.19	442.09	2,462.05	5,964.98
S	1	108.31	2,400.35*	506.42	973.66
BC	12	63.40	514.95	10,411.09	4,586.47
BD	3	133.17	174.04	1,997.56	5,030.73
BS	3	15.65	483.10	10,121.64	5,289.74
CD	4	87.14	598.09	5,776.62	6,024.37
CS	4	26.98	935.64	10,155.59	5,482.25
DS	1	0.49	1,475.81	15,096.97	6,968.49
MA	1	0.55	1,130.52	401.13	1,580.14
CA	1	128.78	53.80	68.59	141.25
IQ	1	0.18	425.33	14,784.54	2,733.30

* $P < .05$

Table 26

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Absolute Goal Discrepancy Scores: Discrimination Learning Verbal Task

Variable	Level of Practice	Comparison	$\frac{(b_i - b_j) x}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$z_{.05}S$	$z_{.01}S$	Results
B	A2	B1:B2	41.2619	66.0645	86.8140	B1=B2
		B1:B3	42.1554	72.0270	93.0150	B1=B3
		B1:B4	96.7628	69.6420	90.6300	B1>B4**
		B2:B3	31.8074	69.6420	90.6300	B2=B3
		B2:B4	0.8388	66.0645	86.8140	B2=B4
		B3:B4	13.3226	66.0645	86.8140	B3=B4
C	A2	C1:C2	3.8213	69.6420	90.6300	C1=C2
		C1:C3	3.1890	66.0645	86.8140	C1=C3
		C1:C4	60.2484	66.0645	86.8140	C1=C4
		C1:C5	84.0728	69.6420	90.6300	C1<C5*
		C2:C3	0.6590	66.0645	86.8140	C2=C3
		C2:C4	64.1020	72.0270	93.0150	C2=C4
		C2:C5	87.1897	73.6965	94.9230	C2<C5*
		C3:C4	63.4374	69.6420	90.6300	C3=C4
		C3:C5	87.2618	72.0270	93.0150	C3<C5*
		C4:C5	24.0218	66.0645	86.8140	C4=C5
S	A2	S1:S2	69.0616	66.0645	86.8140	S1>S2*

* $P < .05$

** $P < .01$

Table 27

Mean Positive Goal Discrepancy Scores:
Discrimination Learning Verbal Task

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	3.3512	4.9215	10.3982	8.1352
	B2	3.0445	4.3421	1.6167	1.3770
	B3	0.8284	3.7882	-0.6787	-4.5926
	B4	4.1234	3.3326	8.1565	7.4116
C	C1	2.7298	1.7469	4.4276	2.0424
	C2	3.4807	4.4621	4.5529	2.6793
	C3	2.0404	3.5375	3.8242	1.7357
	C4	4.5233	5.5958	7.4363	5.3799
	C5	3.9103	5.1382	4.1250	3.5767
D	D1	2.8382	4.2741	5.5927	3.2737
	D2	3.8356	3.9181	4.1537	2.8919
S	S1	3.7190	5.1364	5.5983	3.7485
	S2	2.9548	3.0558	4.1501	2.4171
BC	B1C1	3.6829	2.9009	14.8546	6.1328
	B1C2	3.6447	4.8555	9.2308	7.3913
	B1C3	5.3448	5.2071	9.2668	6.0173
	B1C4	6.5530	5.6803	8.4795	13.0655
	B1C5	7.5311	5.9837	10.1593	8.0691
	B2C1	2.3311	1.1387	0.3414	0.7911
	B2C2	3.8613	5.6055	1.7522	1.3819
	B2C3	0.0084	2.7239	1.8322	0.0264
	B2C4	4.0641	6.0472	3.8796	0.3951
	B2C5	4.9576	6.1952	0.2781	4.2905
	B3C1	0.2023	1.0492	-4.9722	-5.4832
	B3C2	2.3016	4.7235	-0.1516	-5.8045
	B3C3	-0.6986	2.3286	-3.2825	-5.5828
	B3C4	3.6942	5.1612	7.5591	-1.9034
	B3C5	-1.3575	5.6785	-1.5463	-4.1891
	B4C1	4.7029	1.8938	7.4865	6.7289
	B4C2	4.1152	2.6639	7.3801	7.7485
	B4C3	3.5070	3.8904	9.4802	6.4819
	B4C4	3.7819	5.5145	9.8769	9.9624
	B4C5	4.5100	2.6954	7.6080	6.1363

Table 27 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
BD	B1D1	4.1723	4.9327	11.5970	9.3811
	B2D1	1.3903	3.7147	1.1613	0.4696
	B3D1	0.8664	4.7985	0.9999	- 3.7163
	B4D1	4.9238	3.6505	8.6125	6.9604
	B1D2	6.5303	4.9103	9.1994	6.8893
	B2D2	4.6987	4.9695	2.0721	2.2844
	B3D2	0.7904	2.7779	-2.3573	-5.4689
	B4D2	3.3230	3.0147	7.7005	7.8628
BS	B1S1	6.6156	5.6033	12.2639	9.9993
	B2S1	3.2664	6.0522	1.9479	1.7371
	B3S1	1.2850	5.0749	-0.5418	-4.4788
	B4S1	3.7086	3.8152	8.7151	7.7364
	B1S2	4.0870	4.2397	8.5325	6.2711
	B2S2	2.8226	2.6320	1.2855	1.0169
	B3S2	0.3718	2.5015	-0.8156	-4.7064
	B4S2	4.5382	2.8500	7.5979	7.0868
CD	C1D1	2.0741	2.2866	6.7497	2.5477
	C2D1	2.9521	4.4134	3.9952	2.1690
	C3D1	1.3006	3.7817	4.3593	2.1288
	C4D1	5.3846	5.3501	9.0890	7.3599
	C5D1	2.4796	5.5387	3.7703	2.1631
	C1D2	3.3855	1.2072	2.1055	1.5371
	C2D2	4.0093	4.5108	5.1106	3.1896
	C3D2	2.7802	3.2933	3.2892	1.3426
	C4D2	3.6620	5.8415	5.7836	3.3999
	C5D2	5.3410	4.7377	4.4798	4.9903
CS	C1S1	2.4013	1.5252	6.0363	1.9545
	C2S1	3.5961	4.1873	4.7012	2.5900
	C3S1	2.5035	3.2008	3.5951	1.8409
	C4S1	5.2828	7.8410	7.3690	7.0006
	C5S1	4.8114	8.9277	6.2799	5.3565
	C1S2	3.0583	1.9686	2.8189	2.1303
	C2S2	3.3653	4.7369	4.4046	2.7686
	C3S2	1.5773	3.8742	4.0534	1.6305
	C4S2	3.7638	3.3506	7.5036	3.7542
	C5S2	3.0092	1.3487	1.9702	1.7969

Table 27 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
DS	D1S1	2.6833	5.0341	5.8620	3.6573
	D2S1	3.6807	4.6781	4.3830	3.2755
	D1S2	2.9931	3.5141	5.3634	2.8901
	D2S2	3.9905	3.1581	3.9244	2.5083

Table 28

Results of Analyses of Covariance Among Mean Positive Goal Discrepancy Scores: Discrimination Learning Verbal Task

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	311	62.11	66.93	160.68	68.36
Regression	39	138.63	202.99	319.04	148.33
Error	272	51.14	47.42	137.97	56.89
B	3	37.49	28.57	217.83	154.05*
C	4	56.63	138.25*	130.34	128.73
D	1	74.97	9.55	156.07	10.98
S	1	42.02	311.51*	150.50	127.57
BC	12	38.68	17.04	129.75	39.85
BD	3	93.77	34.98	64.86	78.83
BS	3	32.55	22.94	41.44	43.85
CD	4	42.33	6.28	93.26	97.05
CS	4	14.37	200.13**	66.12	51.29
DS	1	83.20	22.66	70.35	22.96
MA	1	6.10	43.15	419.89	38.41
CA	1	36.96	2.65	30.54	59.34
IQ	1	0.31	1.13	435.23	447.58**

* $P < .05$
** $P < .01$

Table 29

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Positive Goal Discripancy Scores: Discrimination Learning Verbal Task

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$S_{.05}S$	$S_{.01}S$	Results
B	A4	B1:B2	2.5066	20.8930	27.4551	B1=B2
		B1:B3	15.1120	22.0244	28.6619	B1=B3
		B1:B4	101.0244	22.7787	29.4161	B1>B4**
		B2:B3	27.6542	20.8930	27.4551	B2>B3**
		B2:B4	36.0126	22.0244	28.6619	B2>B4**
		B3:B4	11.9392	20.8930	27.4551	B3=B4
C	A2	C1:C2	20.8557	20.1077	26.1676	C1<C2*
		C1:C3	13.8700	19.0748	25.0658	C1=C3
		C1:C4	29.8136	21.2784	27.4071	C1<C4**
		C1:C5	26.2690	20.7963	26.8562	C1<C5*
		C2:C3	7.1019	19.0748	25.0658	C2=C3
		C2:C4	8.7816	20.1077	26.1676	C2=C4
		C2:C5	5.1932	19.0748	25.0658	C2=C5
		C3:C4	15.9436	20.7963	26.8562	C3=C4
		C3:C5	12.3990	20.1077	26.1676	C3=C5
		C4:C5	3.5739	19.0748	25.0658	C4=C5
S	A2	S1:S2	19.7408	19.0748	25.0658	S1>S2*
CS	A2	C5S2:C3S1	13.3746	19.0748	25.0658	C5S2=C3S1
		C5S2:C2S1	14.0515	20.1077	26.1676	C5S2=C2S1
		C5S2:C1S1	14.4197	20.7963	26.8562	C5S2=C1S1
		C5S2:C4S2	11.6596	21.2784	27.4071	C5S2=C4S2
		C5S2:C4S1	38.3366	21.6915	27.8202	C5S2<C4S1**
		C5S2:C1S2	30.2837	21.9670	28.1646	C5S2<C1S2**
		C5S2:C2S2	30.6850	22.2424	28.5089	C5S2<C2S2**
		C5S2:C3S2	30.6012	22.4490	28.7155	C5S2<C3S2**
		C5S2:C5S1	32.5294	22.6556	28.9220	C5S2<C5S1**
		C3S1:C2S1	0.4716	19.0748	25.0658	C3S1=C2S1
		C3S1:C1S1	0.8688	20.1077	26.1676	C3S1=C1S1
		C3S1:C4S2	1.6868	20.7963	26.8562	C3S1=C4S2
		C3S1:C4S1	19.4928	21.2784	27.4071	C3S1=C4S1
		C3S1:C1S2	25.8568	21.6915	27.8202	C3S1<C1S2*
		C3S1:C2S2	25.9622	21.9670	28.1646	C3S1<C2S2*
		C3S1:C3S2	16.2933	22.2424	28.5089	C3S1=C3S2
		C3S1:C5S1	30.6012	22.4490	28.7155	C3S1<C5S1**
		C2S1:C1S1	0.4048	19.0748	25.0658	C2S1=C4S1
		C2S1:C4S2	1.0857	20.1077	26.1676	C2S1=C4S2
		C2S1:C4S1	19.1917	20.7963	26.8562	C2S1=C4S1

Table 29 (Continued)

Vari-able	Level of Practice	Compari-son	$\frac{(b_i-b_j)\times}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$\hat{a}_{.05}S$	$\hat{a}_{.01}S$	Results
		C2S1:C1S2	25.3813	21.2784	27.4071	C2S1<C1S2*
		C2S1:C2S2	15.7815	21.6915	27.8202	C2S1=C2S2
		C2S1:C3S2	25.9622	21.9670	28.1646	C2S1<C3S2*
		C2S1:C5S1	30.6850	22.2424	28.5089	C2S1<C5S1**
		C1S1:C4S2	0.5564	19.0748	25.0658	C1S1=C4S2
		C1S1:C4S1	18.7869	20.1077	26.1676	C1S1=C4S1
		C1S1:C1S2	15.1435	20.7963	26.8562	C1S1=C1S2
		C1S1:C2S2	25.3813	21.2784	27.4071	C1S1<C2S2*
		C1S1:C3S2	25.8568	21.6915	27.8202	C1S1<C3S2*
		C1S1:C5S1	30.2837	21.9670	28.1646	C1S1<C5S1**
		C4S2:C4S1	14.4584	19.0748	25.0658	C4S2=C4S1
		C4S2:C1S2	18.7869	20.1077	26.1676	C4S2=C1S2
CS	A2	C4S2:C2S2	19.1917	20.7963	26.6562	C4S2=C2S2
(Continued)		C4S2:C3S2	19.4928	21.2784	27.4071	C4S2=C3S2
		C4S2:C5S1	38.3366	21.6915	27.8202	C4S2<C5S1**
		C4S1:C1S2	0.5564	19.0748	25.0658	C4S1=C1S2
		C4S1:C2S2	1.0857	20.1077	26.1676	C4S1=C2S2
		C4S1:C3S2	1.6868	20.7963	26.8562	C4S1=C3S2
		C4S1:C5S1	11.6596	21.2784	27.4071	C4S1=C5S1
		C1S2:C2S2	0.4048	19.0748	25.0658	C1S2=C2S2
		C1S2:C3S2	0.8688	20.1077	26.1676	C1S2=C3S2
		C1S2:C5S1	14.4197	0.7963	26.8562	C1S2=C5S1
		C2S2:C3S2	0.4716	19.0748	25.0658	C2S2=C3S2
		C2S2:C5S1	14.0515	20.1077	26.1676	C2S2=C5S1
		C3S2:C5S1	13.3746	19.0748	25.0658	C3S2=C5S1

* $P < .05$
** $P < .01$

Table 30

Mean Negative Goal Discrepancy Scores:
Discrimination Learning Verbal Task

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	-3.8997	-5.2325	-9.0879	-6.9169
	B2	-2.1623	-3.5265	-1.8860	-1.1713
	B3	-1.1467	-1.9205	+0.0532	-1.0712
	B4	-2.2789	-3.1210	-6.8673	-6.2194
C	C1	-1.6057	-3.3808	-3.4052	-2.7964
	C2	-2.7450	-3.2003	-2.5752	-2.3839
	C3	-1.8680	-2.4712	-3.1327	-2.7964
	C4	-1.3644	-3.7805	-9.3273	-8.1483
	C5	-4.2762	-4.4177	-3.7946	-3.0985
D	D1	-2.4877	-3.6353	-3.8850	-2.3090
	D2	-2.2561	-3.2649	-5.0090	-5.3804
S	S1	-2.6032	-3.8867	-3.7862	-2.8461
	S2	-2.1406	-3.0135	-5.1078	-4.8433
BC	B1C1	-3.2872	-6.9513	-11.4039	-7.9498
	B1C2	-4.7773	-4.7458	-7.7134	-6.6720
	B1C3	-2.0819	-3.8500	-7.5082	-5.8407
	B1C4	-1.5118	-5.1955	-9.7243	-5.4004
	B1C5	-7.8401	-5.4199	-9.0897	-8.7216
	B2C1	-1.4008	-2.3315	-1.4056	-1.8845
	B2C2	-3.5113	-2.8685	-0.9329	-0.2852
	B2C3	-0.8825	-2.4547	-2.5318	-2.7188
	B2C4	-1.6598	-5.3750	-3.2636	-0.5338
	B2C5	-3.3569	-4.6028	-1.2961	-0.4342
	B3C1	+0.1427	-0.6076	+5.7041	+4.5552
	B3C2	-1.2844	-0.9690	+4.6996	+3.4392
	B3C3	-1.9207	-0.9621	+4.1976	+4.3675
	B3C4	-0.1673	-2.7352	-16.9040	-21.0458
	B3C5	-2.5036	-4.3286	+2.5687	+3.3279
	B4C1	-1.8775	-3.6329	-6.5154	-5.9065
	B4C2	-1.4070	-4.2180	-6.3541	-6.0176
	B4C3	-2.5869	-2.6181	-6.6884	-6.9936
	B4C4	-2.1187	-1.8164	-7.4173	-5.6132
	B4C5	-3.4042	-3.3196	-7.3613	-6.5661

Table 30 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
BD	B1D1	-2.9230	-5.5222	-9.5886	-6.5519
	B2D1	-3.1317	-4.3309	-1.2749	-1.2856
	B3D1	-1.7409	-1.8761	+1.5113	+4.7095
	B4D1	-2.1552	-2.8121	-6.1878	-6.1080
	B1D2	-4.8764	-4.9428	-8.5872	-7.2819
	B2D2	-1.1929	-2.7721	-2.4971	-1.0570
	B3D2	-0.5525	-1.9649	-1.4049	-6.8519
	B4D2	-2.4026	-3.4299	-7.5468	-6.3308
BS	B1S1	-3.6877	-6.1462	-10.5242	-7.5908
	B2S1	-2.8794	-4.5008	-1.9640	-1.1654
	B3S1	-1.1240	-1.7103	+4.4447	+3.8510
	B4S1	-2.7217	-3.1896	-7.1008	-6.4792
	B1S2	-4.1117	-4.3188	-7.6511	-6.2430
	B2S2	-1.4452	-2.5522	-1.8080	-1.1772
	B3S2	-1.1694	-2.1307	-4.3383	-5.9934
	B4S2	-1.8361	-3.0524	-6.6338	-5.9596
CD	C1D1	-1.0838	-4.0410	-4.1634	-2.8889
	C2D1	-3.8025	-2.3143	-1.9066	-1.6255
	C3D1	-2.4246	-3.0363	-3.9288	-3.5552
	C4D1	-1.4129	-5.6962	-6.7475	-0.4611
	C5D1	-3.7145	-3.0887	-2.6787	-3.0143
	C1D2	-2.1276	-2.7206	-2.6470	-2.7039
	C2D2	-1.6875	-4.0863	-3.2438	-3.1423
	C3D2	-1.3114	-1.9061	-2.3366	-2.0376
	C4D2	-1.3159	-1.8648	-11.9071	-15.8355
	C5D2	-4.8379	-5.7467	-4.9105	-3.1827
CS	C1S1	-2.1208	-4.5308	-4.7616	-3.4715
	C2S1	-3.4241	-2.9367	-3.1166	-3.4785
	C3S1	-1.0650	-2.6812	-3.8978	-3.3032
	C4S1	-1.6155	-5.0398	-4.2509	-1.2556
	C5S1	-4.7904	-4.2450	-2.9042	-2.7217
	C1S2	-1.0906	-2.2308	-2.0488	-2.1213
	C2S2	-2.0659	-3.4639	-2.0338	-1.2893
	C3S2	-2.6710	-2.2612	-2.3677	-2.2898
	C4S2	-1.1133	-2.5212	-14.4037	-15.0410
	C5S2	-3.7620	-4.5904	-4.6850	-3.4753

Table 30 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
DS	D1S1	-3.2972	-4.8877	-4.7626	-3.1167
	D2S1	-3.0656	-3.6441	-5.8866	-6.1881
	D1S2	-1.6782	-2.3829	-3.0074	-1.5013
	D2S2	-1.4466	-2.8857	-4.1314	-4.5727

Table 31

Results of Analyses of Covariance Among Mean Negative Goal Discrepancy Scores: Discrimination Learning Verbal Task

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	311	48.82	40.33	322.05	633.95
Regression	39	85.49	134.20	526.40	713.51
Error	272	43.57	26.87	292.74	622.54
B	3	36.18	60.30	164.03	90.42
C	4	86.13	31.04	464.75	356.47
D	1	4.04	10.35	95.21	711.04
S	1	15.40	54.87	125.71	287.08
BC	12	19.68	22.70	325.39	533.43
BD	3	55.33	17.29	48.84	609.50
BS	3	12.89	25.82	477.42	509.41
CD	4	29.22	103.24**	121.59	733.85
CS	4	20.20	30.21	392.33	645.33
DS	1	96.44	192.02**	682.79	941.30
MA	1	10.33	31.43	0.89	263.19
CA	1	27.77	0.52	3.63	61.54
IQ	1	0.96	11.37	268.30	24.87

** $P < .01$

Table 32

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Negative Goal Discrepancy Scores: Discrimination Learning Verbal Task

Variable	Level of Practice	Comparison	(b_i-b_j) x $\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$Z_{.05}S$	$Z_{.01}S$	Results
CD	A2	C4D1:C5D2	2.1737	14.3586	18.8683	C4D1=C5D2
		C4D1:C2D2	6.6259	15.1361	19.6977	C4D1=C2D2
		C4D1:C1D1	9.8054	15.6545	20.2160	C4D1=C1D1
		C4D1:C3D1	10.4617	16.0173	20.6307	C4D1=C3D1
		C4D1:C3D2	21.3135	16.3283	20.9417	C4D1<C3D2**
		C4D1:C1D2	17.2252	16.5357	21.2009	C4D1<C1D2*
		C4D1:C2D1	21.8814	16.7430	21.4601	C4D1<C2D1**
		C4D1:C5D1	25.3414	16.8985	21.6156	C4D1<C5D1**
		C4D1:C4D2	21.3346	17.0540	21.7711	C4D1<C4D2*
		C5D2:C2D2	3.4316	14.3586	18.8683	C5D2=C2D2
		C5D2:C1D1	10.3917	15.1361	19.6977	C5D2=C1D1
		C5D2:C3D1	11.3430	15.6545	20.2160	C5D2=C3D1
		C5D2:C3D2	14.7930	16.0173	20.6307	C5D2=C3D2
		C5D2:C1D2	15.4083	16.3283	20.9417	C5D2=C1D2
		C5D2:C2D1	26.1107	16.5357	21.2009	C5D2<C2D1**
		C5D2:C5D1	18.6680	16.7430	21.4601	C5D2<C5D1*
		C5D2:C4D2	25.3414	16.8985	21.6156	C5D2<C4D2**
		C2D2:C1D1	5.9913	14.3586	18.8683	C2D2=C1D1
		C2D2:C3D1	6.8783	15.1361	19.6977	C2D2=C3D1
		C2D2:C3D2	11.3330	15.6545	20.2160	C2D2=C3D2
		C2D2:C1D2	11.9767	16.0173	20.6307	C2D2=C1D2
		C2D2:C2D1	13.2062	16.3283	20.9417	C2D2=C2D1
		C2D2:C5D1	26.1107	16.5357	21.2009	C2D2<C5D1**
		C2D2:C4D2	21.8814	16.7430	21.4601	C2D2<C4D2**
		C1D1:C3D1	0.7369	14.3586	18.8683	C1D1=C3D1
		C1D1:C3D2	8.6340	15.1361	19.6977	C1D1=C3D2
		C1D1:C1D2	5.7788	15.6545	20.2160	C1D1=C1D2
		C1D1:C2D1	11.9767	16.0173	20.6307	C1D1=C2D1
		C1D1:C5D1	15.4083	16.3283	20.9417	C1D1=C5D1
		C1D1:C4D2	21.9443	16.5357	21.2009	C1D1<C4D2**
		C3D1:C3D2	4.6835	14.3586	18.8683	C3D1=C3D2
		C3D1:C1D2	8.6340	15.1361	19.6977	C3D1=C1D2
		C3D1:C2D1	11.3330	15.6545	20.2160	C3D1=C2D1
		C3D1:C5D1	14.7930	16.0173	20.6307	C3D1=C5D1
		C3D1:C4D2	21.3135	16.3283	20.9417	C3D1<C4D2**
		C3D2:C1D2	0.7369	14.3586	18.8683	C3D2=C1D2
		C3D2:C2D1	6.8783	15.1361	19.6977	C3D2=C2D1
		C3D2:C5D1	11.3430	15.6545	20.2160	C3D2=C5D1
		C3D2:C4D2	10.4617	16.0173	20.6307	C3D2=C4D2
		C1D2:C2D1	5.9913	14.3586	18.8683	C1D2=C2D1
		C1D2:C5D1	10.3917	15.1361	19.6977	C1D2=C5D1
		C1D2:C4D2	9.8054	15.6545	20.2160	C1D2=C4D2
		C2D1:C5D1	3.4316	14.3586	18.8683	C2D1=C5D1
		C2D1:C4D2	6.6259	15.1361	19.6977	C2D1=C4D2
		C5D1:C4D2	2.1737	14.3586	18.8683	C5D1=C4D2

Table 32 (Continued)

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2}/\sqrt{c_{ii}+c_{jj}-2c_{ij}}$	$Z_{.05}S$	$Z_{.01}S$	Results
DS	A2	D1S1:D2S2	-------[a]	14.3586	18.8683	D1S1=D2S2
		D1S1:D2S1	19.5121	15.1361	19.6977	D1S1<D2S1*
		D1S1:D1S2	19.5121	15.6545	20.2160	D1S1<D1S2*
		D2S2:D2S1	19.5121	14.3586	18.8683	D2S2<D2D1**
		D2S2:D1S2	19.5121	15.1361	19.6977	D2S2<D1S2*
		D2S1:D1S2	-------[b]	14.3586	18.8683	D2S1=D1S2

* $P < .05$
** $P < .01$

[a,b] The operation involved indeterminate numbers.

TABLE 33

COMPARISON OF THE GROUPS IN TERMS OF DIRECTIONS OF GOAL CHANGE AFTER SUCCESS AND FAILURE: DISCRIMINATION LEARNING VERBAL TASK (FREQUENCIES)

Comparison	Trial 9				Trial 10				Trial 17				Trial 18			
	Direction				Direction				Direction				Direction			
	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T
B1D1C1	5	2	1	8	8	0	0	8	6	2	0	8	7	1	0	8
B1D1C2	6	1	1	8	6	1	1	8	6	1	1	8	5	1	2	8
B1D1C5	5	0	0	5	2	1	0	3	2	1	1	4	3	0	0	3
B1D2C1	6	1	1	8	8	0	0	8	6	0	2	8	7	0	1	8
B1D2C2	5	2	1	8	6	2	0	8	5	2	1	8	7	0	1	8
B1D2C5	4	0	1	5	5	1	0	6	5	1	0	6	4	0	0	4
B2D1C1	6	2	0	8	8	0	0	8	6	1	1	8	7	0	1	8
B2D1C2	8	0	0	8	7	1	0	8	7	0	1	8	7	0	1	8
B2D1C5	4	1	0	5	5	0	0	5	3	1	1	5	4	0	0	4
B2D2C1	7	0	1	8	7	1	0	8	7	1	0	8	7	1	0	8
B2D2C2	6	1	1	8	5	1	2	8	5	1	2	8	8	0	0	8
B2D2C5	6	0	0	6	4	0	0	4	2	3	1	6	3	1	3	7
B3D1C1	6	0	2	8	7	0	1	8	6	1	1	8	7	0	1	8
B3D1C2	8	0	0	8	8	0	0	8	7	0	1	8	8	0	0	8
B3D1C5	5	0	1	6	4	1	1	6	1	1	3	5	3	0	1	4
B3D2C1	7	0	1	8	8	0	0	8	7	0	1	8	7	0	1	8
B3D2C2	4	0	4	8	7	0	1	8	6	0	2	8	6	0	2	8
B3D2C5	4	2	1	7	5	0	1	6	5	1	0	6	2	2	1	5
B4D1C1	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B4D1C2	7	0	1	8	8	0	0	8	8	0	0	8	8	0	0	8
B4D1C5	4	0	0	4	4	0	0	4	2	0	1	3	4	0	1	5
B4D2C1	8	0	0	8	8	0	0	8	7	1	0	8	8	0	0	8
B4D2C2	5	2	1	8	7	0	1	8	8	0	0	8	8	0	0	8
B4D2C5	7	0	0	7	0	0	0	0	2	0	1	3	3	1	0	4
	Trial 9				Trial 10				Trial 17				Trial 18			
	Direction				Direction				Direction				Direction			
	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T
B1D1C3	0	7	1	8	0	7	1	8	0	7	1	8	0	7	1	8
B1D1C4	0	6	2	8	0	6	2	8	0	5	3	8	0	7	1	8
B1D1C5	1	1	1	3	0	4	1	5	0	3	1	4	0	3	2	5
B1D2C3	1	6	1	8	0	7	1	8	2	6	0	8	2	6	0	8
B1D2C4	2	4	2	8	0	8	0	8	0	5	3	8	0	7	1	8
B1D2C5	0	2	1	3	0	1	1	2	0	0	2	2	0	3	1	4
B2D1C3	0	6	2	8	0	7	1	8	2	4	2	8	1	6	1	8
B2D1C4	0	6	2	8	1	6	1	8	2	5	1	8	0	7	1	8
B2D1C5	0	2	1	3	0	2	1	3	0	2	1	3	0	3	1	4
B2D2C3	0	8	0	8	0	6	2	8	1	6	1	8	0	6	2	8
B2D2C4	1	5	2	8	0	7	1	8	0	6	2	8	1	5	2	8
B2D2C5	1	0	1	2	1	3	0	4	0	2	0	2	0	1	0	1

TABLE 33 -- (Continued)

Comparison	Trial 9				Trail 10				Trial 17				Trial 18			
	Direction				Direction				Direction				Direction			
	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T
B3D1C3	0	7	1	8	1	7	0	8	1	7	0	8	0	8	0	8
B3D1C4	3	4	1	8	0	7	1	8	0	6	2	8	1	4	3	8
B3D1C5	1	1	0	2	1	1	0	2	0	1	2	3	2	2	0	4
B3D2C3	0	7	1	8	1	5	2	8	1	7	0	8	2	6	0	8
B3D2C4	0	5	3	8	1	4	3	8	0	6	2	8	0	6	2	8
B3D2C5	0	1	0	1	0	2	0	2	1	1	0	2	0	3	0	3
B4D1C3	3	5	0	8	2	6	0	8	1	6	1	8	1	7	0	8
B4D1C4	1	6	1	8	1	5	2	8	1	6	1	8	2	4	2	8
B4D1C5	0	4	0	4	1	3	0	4	0	4	1	5	0	3	0	3
B4D2C3	0	7	1	8	1	7	0	8	0	7	1	8	0	8	0	8
B4D2C4	1	7	0	8	2	6	0	8	1	6	1	8	0	8	0	8
B4D2C5	0	0	1	1	1	7	0	8	0	4	1	5	0	3	1	4

	Trial 11				Trial 14				Trial 15				Trial 19			
	Direction				Direction				Direction				Direction			
	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T
B1D1C1	7	1	0	8	6	1	1	8	8	0	0	8	7	0	1	8
B1D1C2	6	1	1	8	4	2	2	8	7	0	1	8	6	1	1	8
B1D1C3	8	0	0	8	6	2	0	8	7	1	0	8	7	0	1	8
B1D1C5	4	0	1	5	3	1	1	5	2	0	2	4	2	0	1	3
B1D2C1	7	1	0	8	6	1	1	8	7	0	1	8	6	1	1	8
B1D2C2	8	0	0	8	7	1	0	8	6	0	2	8	5	2	1	8
B1D2C3	5	0	3	8	7	0	1	8	7	1	0	8	7	0	1	8
B1D2C5	3	1	1	5	1	2	0	3	2	2	0	4	3	1	1	5
B2D1C1	7	0	1	8	7	1	0	8	8	0	0	8	7	0	1	8
B2D1C2	7	0	1	8	7	0	1	8	7	0	1	8	6	1	1	8
B2D1C3	6	1	1	8	6	1	1	8	7	1	0	8	7	1	0	8
B2D1C5	6	0	0	6	5	0	0	5	3	1	0	4	4	0	0	4
B2D2C1	6	2	0	8	8	0	0	8	7	0	1	8	8	0	0	8
B2D2D2	8	0	0	8	7	0	1	8	7	1	0	8	7	1	0	8
B2D2C3	7	0	1	8	7	1	0	8	6	2	0	8	6	2	0	8
B2D2C5	5	0	1	6	3	0	1	4	4	0	2	6	6	0	1	7
B3D1C1	5	2	1	8	7	1	0	8	7	0	1	8	8	0	0	8
B3D1C2	7	1	0	8	6	2	1	8	6	1	1	8	8	0	0	8
B3D1C3	5	0	3	8	5	0	3	8	4	3	1	8	5	2	1	8
B3D1C5	2	0	1	3	6	0	0	6	3	1	2	6	3	0	0	3
B3D2C1	8	0	0	8	7	1	0	8	8	0	0	8	8	0	0	8
B3D2C2	6	1	1	8	7	0	1	8	8	0	0	8	5	0	3	8
B3D2C3	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B3D2C5	4	4	0	8	2	1	2	5	4	2	2	8	4	0	2	6
B4D1C1	7	0	1	8	7	0	1	8	8	0	0	8	8	0	0	8
B4D1C2	7	1	0	8	7	0	1	8	8	0	0	8	8	0	0	8
B4D1C3	7	0	1	8	6	0	2	8	7	0	1	8	8	0	0	8
B4D1C5	5	0	0	5	5	0	0	5	1	0	0	1	4	0	0	4
B4D2C1	8	0	0	8	7	0	1	8	8	0	0	8	8	0	0	8
B4D2C2	6	0	2	8	8	0	0	8	7	0	1	8	7	1	0	8
B4D2C3	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B4D2C5	3	0	0	3	2	0	3	5	3	0	1	4	2	0	0	2

TABLE 33--(Continued)

Comparison	Trial 12				Trial 13				Trial 16				Trial 20			
	Direction				Direction				Direction				Direction			
	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T
B1D1C2	2	4	2	8	1	6	1	8	1	6	1	8	1	6	1	8
B1D1C3	0	7	1	8	1	6	1	8	0	7	1	8	0	7	1	8
B1D1C4	0	6	2	8	3	3	2	8	0	7	1	8	0	6	2	8
B1D1C5	0	3	1	4	1	1	2	4	0	2	1	3	1	1	1	3
B1D2C2	0	6	2	8	3	3	2	8	1	4	3	8	0	4	4	8
B1D2C3	1	6	1	8	2	5	1	8	1	7	0	8	2	5	1	8
B1D2C4	0	7	1	8	0	6	2	8	2	5	1	8	2	6	0	8
B1D2C5	2	2	0	4	1	1	1	3	0	2	1	3	2	1	0	3
B2D1C2	1	6	1	8	2	5	1	8	3	5	0	8	0	8	0	8
B2D1C3	0	4	4	8	0	7	1	8	0	4	4	8	0	6	2	8
B2D1C4	0	6	2	8	0	8	0	8	0	7	1	8	1	6	1	8
B2D1C5	0	2	1	3	1	2	1	4	0	2	1	3	1	3	1	5
B2D2C2	1	7	0	8	0	5	3	8	2	5	1	8	0	7	1	8
B2D2C3	0	7	1	8	0	7	1	8	2	6	0	8	0	7	1	8
B2D2C4	0	7	1	8	1	6	1	8	1	6	1	8	0	5	3	8
B2D2C5	1	2	0	3	1	2	0	3	1	2	1	4	0	3	1	4
B3D1C2	1	7	0	8	3	4	1	8	2	5	1	8	2	5	1	8
B3D1C3	0	8	0	8	2	6	0	8	0	8	0	8	1	6	1	8
B3D1C4	2	4	2	8	1	5	2	8	1	4	3	8	2	6	0	8
B3D1C5	0	2	0	2	0	2	1	3	0	5	3	8	0	2	2	4
B3D2C2	2	6	0	8	0	7	1	8	2	5	1	8	1	4	3	8
B3D2C3	0	7	1	8	0	8	0	8	0	7	1	8	1	7	0	8
B3D2C4	1	7	0	8	2	5	1	8	2	3	3	8	1	5	2	8
B3D2C5	0	3	0	3	0	1	0	1	0	4	0	4	1	4	0	5
B4D1C2	0	7	1	8	0	7	1	8	0	8	0	8	0	6	2	8
B4D1C3	1	5	2	8	0	8	0	8	1	6	1	8	0	8	0	8
B4D1C4	1	5	2	8	0	8	0	8	1	5	2	8	1	7	0	8
B4D1C5	1	2	1	4	0	6	0	6	1	3	2	6	0	3	0	3
B4D2C2	0	8	0	8	0	7	1	8	0	7	1	8	0	8	0	8
B4D2C3	0	7	1	8	0	7	1	8	0	8	0	8	0	7	1	8
B4D2C4	1	6	1	8	0	8	0	8	1	7	0	8	1	7	0	8
B4D2C5	0	1	1	2	0	3	1	4	1	2	1	4	0	4	1	5

Table 33 (Continued)

Comparison	Trial 21				Trial 22				Trial 23			
	Direction				Direction				Direction			
	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T
B1D1C1	7	1	0	8	8	0	0	8	5	3	0	8
B1D1C2	5	1	2	8	6	1	1	8	6	1	1	8
B1D1C3	8	0	0	8	8	0	0	8	7	0	1	8
B1D1C4	5	2	1	8	6	0	2	8	6	0	2	8
B1D1C5	4	0	2	6	0	1	1	2	1	0	2	3
B1D2C1	5	2	1	8	5	2	1	8	6	1	1	8
B1D2C2	6	1	1	8	5	2	1	8	7	1	0	8
B1D2C3	6	0	2	8	5	2	1	8	7	1	0	8
B1D2C4	7	0	1	8	7	1	0	8	8	0	0	8
B1D2C5	2	1	0	3	6	0	1	7	2	3	0	5
B2D1C1	6	1	1	8	5	1	2	8	6	1	1	8
B2D1C2	6	1	1	8	5	0	3	8	7	0	1	8
B2D1C3	7	1	0	8	7	1	0	8	6	2	0	8
B2D1C4	5	0	3	8	7	0	1	8	7	0	1	8
B2D1C5	2	0	2	4	4	1	1	6	3	0	0	3
B2D2C1	6	1	1	8	6	2	0	8	7	1	0	8
B2D2C2	6	2	0	8	8	0	0	8	7	1	0	8
B2D2C3	6	1	1	8	6	0	2	8	8	0	0	8
B2D2C4	5	0	3	8	7	0	1	8	7	0	1	8
B2D2C5	3	2	0	5	1	0	3	4	5	0	1	6
B3D1C1	7	0	1	8	8	0	0	8	8	0	0	8
B3D1C2	8	0	0	[illegible]	8	0	0	8	6	2	0	8
B3D1C3	5	1	2	8	6	1	1	8	4	2	2	8
B3D1C4	6	0	2	8	7	0	1	8	7	0	1	8
B3D1C5	2	0	1	3	4	0	2	6	2	0	3	5
B3D2C1	7	1	0	8	8	0	0	8	8	0	0	8
B3D2C2	7	0	1	8	6	2	0	8	6	1	1	8
B3D2C3	8	0	0	8	8	0	0	8	8	0	0	8
B3D2C4	4	2	2	8	6	1	1	8	4	2	2	8
B3D2C5	4	3	0	7	3	1	2	6	2	1	2	5
B4D1C1	8	0	0	8	8	0	0	8	8	0	0	8
B4D1C2	7	0	1	8	8	0	0	8	8	0	0	8
B4D1C3	7	0	1	8	7	0	1	8	6	0	2	8
B4D1C4	8	0	0	8	8	0	0	8	8	0	0	8
B4D1C5	7	0	0	7	6	0	0	6	7	1	0	8
B4D2C1	7	1	0	8	7	1	0	8	7	1	0	8
B4D2C2	8	0	0	8	8	0	0	8	8	0	0	8
B4D2C3	8	0	0	8	8	0	0	8	8	0	0	8
B4D2C4	8	0	0	8	8	0	0	8	8	0	0	8
B4D2C5	2	1	1	4	5	1	1	7	2	0	1	3

Table 34

Mean Attainment Time Scores: Discrimination Learning Non-Verbal Task--Comparisons Over All B Groups

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	97.2691	75.6947	61.7644	57.2451
	B2	98.8502	75.7924	64.0129	58.0600
	B3	99.7170	73.8392	64.8282	57.6779
	B4	90.7646	73.4588	62.3461	58.4256
C	C1	93.5565	73.0098	63.8952	58.3999
	C2	93.7129	75.6547	64.4459	59.9656
	C3	100.5074	75.0723	61.7490	56.6151
	C4	92.2886	66.9299	56.0679	50.4023
	C5	98.5642	77.0569	65.1512	60.0434
	C6	101.2717	80.4540	68.1182	61.6867
D	D1	98.1140	76.6816	64.3825	58.7078
	D2	95.1864	72.7110	62.0933	56.9965

Table 35

Results of Analyses of Covariance Among Mean Attainment Time Scores: Discrimination Learning Non-Verbal Task--Comparisons Over All B Groups

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	375	1,700.7037	600.8810	374.0177	331.9983
Regression	12	11,986.7766	5,449.7296	2,606.4289	2,170.2693
Error	363	1,360.6681	440.5884	300.2189	271.2290
B	3	541.8667	90.8983	18.3837	23.0533
C	5	953.3860	1,278.6554*	1,034.8772**	1,016.5262**
D	1	799.5515	1,470.7090	488.8284	273.1978
MA	1	7,646.8000*	1,494.5000	887.6000	902.1000
CA	1	368.8400	12.4000	31.0000	45.6000
IQ	1	5,433.5625*	1,498.6250	374.9375	372.0625

* $P < .05$
** $P < .01$

Table 36

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Attainment Time Scores: Discrimination Learning Non-Verbal Task--Comparisons Over All B Groups

Variable	Level of Practice	Comparison	$\frac{(b_i-b_j)}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}} \times$	$z_{.05}S$	$z_{.01}S$	Results
C	A2	C1:C2	20.8264	61.3200	79.8000	C1=C2
		C1:C3	16.2403	58.1700	76.4400	C1=C3
		C1:C4	47.8731	58.1700	76.4400	C1=C4
		C1:C5	31.8674	63.4200	81.9000	C1=C5
		C1:C6	57.6630	64.8900	83.5800	C1=C6
		C2:C3	4.5860	58.1700	76.4400	C2=C3
		C2:C4	69.2518	63.4200	81.9000	C2>C4*
		C2:C5	11.1297	58.1700	76.4400	C2=C5
		C2:C6	37.7895	61.3200	79.8000	C2=C6
		C3:C4	64.1134	61.3200	79.8000	C3>C4*
		C3:C5	15.6270	61.3200	79.8000	C3=C5
		C3:C6	42.3755	63.4200	81.9000	C3=C6
		C4:C5	80.3815	64.8900	83.5800	C4<C5*
		C4:C6	106.4890	66.1500	84.8400	C4<C6**
		C5:C6	26.5318	58.1700	76.4400	C5=C6
C	A3	C1:C2	4.3363	47.9764	63.0448	C1=C2
		C1:C3	16.8997	47.9764	63.0448	C1=C3
		C1:C4	61.6324	50.5744	65.8160	C1>C4*
		C1:C5	9.8899	50.5744	65.8160	C1=C5
		C1:C6	32.7108	52.3064	67.5480	C1=C6
		C2:C3	21.2361	50.5744	65.8160	C2=C3
		C2:C4	66.4991	52.3064	67.5480	C2>C4*
		C2:C5	5.5981	47.9764	63.0448	C2=C5
		C2:C6	28.9150	50.5744	65.8160	C2=C6
		C3:C4	44.7326	47.9764	63.0448	C3=C4
		C3:C5	26.7896	52.3064	67.5480	C3=C5
		C3:C6	50.1511	53.5188	68.9336	C3=C6
		C4:C5	72.0972	53.5188	68.9336	C4<C5**
		C4:C6	94.8838	54.5580	69.9728	C4<C6**
		C5:C6	23.1722	47.9764	63.0448	C5=C6
C	A4	C1:C2	12.3278	45.5942	59.9144	C1=C2
		C1:C3	14.0539	45.5942	59.9144	C1=C3
		C1:C4	62.9731	48.0632	62.5480	C1>C4**
		C1:C5	12.9402	48.0632	62.5480	C1=C5
		C1:C6	25.4594	49.7092	64.1940	C1=C6
		C2:C3	26.3817	48.0632	62.5480	C2=C3
		C2:C4	75.9063	49.7092	64.1940	C2>C4**

Table 36 (Continued)

Variable	Level of Practice	Comparison	$(b_i - b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$Z_{.05}S$	$Z_{.01}S$	Results
C	A4 (Continued)	C2:C5	0.6173	45.5942	59.8144	C2=C5
		C2:C6	13.5522	48.0632	62.5480	C2=C6
		C3:C4	48.9192	45.5942	59.9144	C3>C4*
		C3:C5	26.9942	49.7092	64.1940	C3=C5
		C3:C6	39.9340	50.8614	65.5108	C3=C6
		C4:C5	76.5237	50.8614	65.5108	C4<C5**
		C4:C6	88.8532	51.8490	66.4984	C4<C6**
		C5:C6	12.8349	45.5942	59.9144	C5=C6

* $P < .05$

** $P < .01$

Table 37

Mean Attainment Time Scores: Discrimination Learning Non-Verbal Task--Comparisons Within the B1 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	89.6719	69.4061	59.8753	54.8192
	C2	88.7276	67.3682	59.5534	55.9246
	C3	85.0457	63.8053	52.9792	47.8853
	C4	75.3571	60.6977	50.5022	45.7709
	C5	79.0795	62.2540	54.5203	48.5163
	C6	80.6052	67.1892	58.0624	54.1930
D	D1	78.4554	63.8557	53.4119	48.0492
	D2	87.7069	66.3844	58.4190	54.3205

Table 38

Results of Analyses of Covariance Among Mean Attainment Time Scores: Discrimination Learning Non-Verbal Task--Comparisons Within the B1 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	90	980.2959	422.0833	269.2521	242.1610
Regression	9	1,317.1657	396.3751	224.7821	303.4707
Error	81	942.8659	424.9398	274.1932	235.3488
C	5	470.1246	166.1881	216.8616	272.8685
D	1	1,929.4554	144.1416	565.1812	886.5969
MA	1	7,268.7993**	1,695.6831	48.1303	0.9789
CA	1	6,393.8500*	967.3667	1.5667	62.1833
IQ	1	7,298.3915**	1,599.4050	49.1024	1.7728

* $P < .05$

** $P < .01$

Table 39

Mean Attainment Time Scores: Discrimination Learning Non-Verbal Task--Comparisons Within the B2 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	94.9515	78.1077	68.4697	62.3738
	C2	96.7556	80.9986	67.4543	61.9358
	C3	107.6295	79.6542	66.4205	62.7204
	C4	106.8145	74.9685	60.7554	54.3160
	C5	110.0736	85.8370	69.7969	65.5942
	C6	121.3377	94.3461	76.5404	68.1906
D	D1	113.7854	88.4764	73.2430	67.7090
	D2	98.7353	76.1610	63.2361	57.3347

Table 40

Results of Analyses of Covariance Among Mean Attainment Time Scores: Discrimination Learning Non-Verbal Task--Comparisons Within the B2 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	95	2,165.0578	505.8197	306.0822	265.5861
Regression	9	2,070.4676	808.1429	557.1105	491.8746
Error	86	2,174.9567	474.1812	279.8118	241.9048
C	5	1,434.7862	669.4879	369.3259	315.0647
D	1	4,864.8222	3,257.4974*	2,150.7397**	2,311.5747*
MA	1	3,299.7992	166.8361	185.6175	16.0877
CA	1	2,567.2331	119.9287	107.7111	0.1427
IQ	1	2,880.9361	195.1477	163.3723	17.7695

* $P < .05$

** $P < .01$

Table 41

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Attainment Time Scores: Discrimination Learning Non-Verbal Task--Comparisons Within the B2 Group

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$Z_{.05}S$	$Z_{.01}S$	Results
D	A2	D1:D2	80.7570	60.3029	79.2428	D1>D2**
D	A3	D1:D2	65.6194	46.3421	60.8972	D1>D2**
D	A4	D1:D2	68.0287	43.1012	56.6384	D1>D2**

** $P < .01$

Table 42

Mean Attainment Time Scores: Discrimination Learning Non-Verbal Task--Comparisons Within the B3 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	118.9644	85.2827	72.9519	65.9890
	C2	109.7401	93.6466	78.4300	73.4523
	C3	132.1447	96.9771	73.9989	67.2534
	C4	120.1210	81.4867	67.1723	60.9125
	C5	129.7286	94.3399	75.2592	66.3380
	C6	118.0439	88.9968	72.1950	65.0791
D	D1	120.9766	90.1910	73.7707	66.9488
	D2	121.9377	90.0523	72.8984	66.0593

Table 43

Results of Analyses of Covariance Among Mean Attainment Time Scores: Discrimination Learning Non-Verbal Task--Comparisons Within the B3 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	94	1,789.9632	551.0439	347.2457	281.1600
Regression	9	2,227.9892	769.9884	366.1975	392.2447
Error	85	1,743.5839	527.8616	345.2391	269.3981
C	5	1,027.1052	547.4330	220.4570	261.5729
D	1	21.5049	0.4479	17.7137	18.4215
MA	1	3,603.0690	65.9943	449.9655	841.2126
CA	1	5,677.5953	1.6007	280.5755	591.7428
IQ	1	2,594.6405	253.7386	609.2974	954.4608

Table 44

Mean Attainment Time Scores: Discrimination Learning Non-Verbal Task--Comparisons Within the B4 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	69.4102	58.0392	53.4210	49.7950
	C2	79.4715	62.0198	53.1281	49.5985
	C3	78.0584	60.5729	54.4464	48.8403
	C4	70.7025	52.6491	47.7310	41.8912
	C5	81.0703	66.3597	59.8811	58.2726
	C6	78.1524	69.1427	65.1981	60.0084
D	D1	77.0318	63.5369	56.9829	52.4836
	D2	75.2640	59.3909	54.2856	50.3184

Table 45

Results of Analyses of Covariance Among Mean Attainment Time Scores: Discrimination Learning Non-Verbal Task--Comparisons Within the B4 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	93	556.8648	369.5948	340.8603	361.9360
Regression	9	917.4086	553.3627	572.8410	625.7082
Error	84	518.2352	349.9054	315.9720	333.6747
C	5	370.1502	541.4218	574.1542	693.2134
D	1	72.5450	399.0019	168.8867	108.8227
MA	1	1,877.3203	37.5948	0.4771	1.0458
CA	1	499.0571	36.0000	111.2286	52.7429
IQ	1	1,228.5420	2.0188	42.5852	39.7434

Table 46

Mean Attainment Time Scores: Discrimination Learning Non-Verbal Task--Comparisons of the Four B Groups (MA, CA, and IQ Not Controlled Statistically)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	82.8153	64.9442	55.7889	51.0356
	B2	106.2603	82.3187	68.2395	62.5218
	B3	121.4013	90.0798	73.3249	66.4930
	B4	76.1239	61.4425	55.5983	51.3584

Table 47

Results of Analyses of Covariance Among Mean Attainment Time Scores: Discrimination Learning Non-Verbal Task--Comparisons of the Four B Groups (MA, CA, and IQ Not Controlled Statistically)

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	375	1700.70	600.88	374.02	332.00
Regression	9	14292.26	6684.20	3112.63	2504.29
Error	366	1391.08	451.29	306.67	278.58
B	3	41351.75***	21070.49***	7531.80***	9124.08***

*** $P < .001$

Table 48

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Attainment Time Scores: Discrimination Learning Non-Verbal Task--Comparisons of the Four B Groups (MA, CA, and IQ Not Controlled Statistically)

Variable	Level of Practice	Comparison	$(b_i - b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$z_{.05}S$	$z_{.01}S$	Results
B	A1	B1:B2	225.96	75.61	99.36	B1<B2**
		B1:B3	371.91	79.71	103.73	B1<B3**
		B1:B4	64.19	75.61	99.36	B1=B4
		B2:B3	147.77	75.61	99.36	B2<B3**
		B2:B4	293.56	79.71	103.73	B2>B4**
		B3:B4	441.03	82.44	106.46	B3>B4**

Table 48 (Continued)

Vari-able	Level of Practice	Compari-son	$\frac{(b_i - b_j) \times}{\sqrt{2/c_{ii} + c_{jj} - 2c_{ij}}}$	$Z_{.05}S$	$Z_{.01}S$	Results
B	A2	B1:B2	167.45	58.84	77.32	B1<B2**
		B1:B3	242.25	62.03	80.72	B1<B3**
		B1:B4	37.84	58.84	77.32	B1=B4
		B2:B3	74.76	58.84	77.32	B2<B3*
		B2:B4	207.66	62.03	80.72	B2>B4**
		B3:B4	380.64	64.15	82.85	B3>B4**
B	A3	B1:B2	120.02	48.51	63.74	B1<B2**
		B1:B3	169.09	51.14	66.55	B1<B3**
		B1:B4	1.82	48.51	63.74	B1=B4
		B2:B3	49.68	48.51	63.74	B2<B3*
		B2:B4	123.11	51.14	66.55	B2>B4**
		B3:B4	172.69	52.89	68.30	B3>B4**
B	A4	B1:B2	110.76	48.73	63.42	B1<B2**
		B1:B3	149.03	50.40	65.09	B1<B3**
		B1:B4	3.16	46.23	60.75	B1=B4
		B2:B3	38.75	46.23	60.75	B2=B3
		B2:B4	108.70	46.23	60.75	B2>B4**
		B3:B4	147.37	48.73	63.42	B3>B4**

* $P < .05$
** $P < .01$

Table 49

Mean Absolute Goal Discrepancy Scores:
Discrimination Learning Non-Verbal Task

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	6.6163	40.0256	41.2613	20.7749
	B2	10.7975	14.7624	22.1256	10.0356
	B3	8.9875	14.1021	7.1197	1.8184
	B4	11.8303	47.5087	45.4954	22.7951
C	C1	6.5654	21.2399	22.0639	9.9712
	C2	8.8958	22.3884	19.9494	10.4221
	C3	9.6148	33.1278	27.7282	14.5226
	C4	10.4367	27.3016	35.2823	11.3981
	C5	12.2768	41.4408	39.9787	22.9660
D	D1	9.4940	26.4947	29.4095	14.4388
	D2	9.6218	31.7047	28.5915	13.2732
S	S1	11.4107	30.3681	29.8659	14.0001
	S2	7.7051	27.8313	28.1351	13.7119
BC	B1C1	7.0915	27.2347	45.2894	17.3957
	B1C2	9.1286	32.4025	32.7647	17.2201
	B1C3	6.3829	58.3776	33.0789	22.8928
	B1C4	4.1305	40.4424	45.8651	21.8405
	B1C5	6.3480	41.6708	49.3084	24.5254
	B2C1	4.5355	8.3535	13.8599	5.5938
	B2C2	8.0617	7.0470	9.3586	7.7509
	B2C3	10.4462	24.5502	23.6388	9.7750
	B2C4	5.7573	11.7146	33.3382	5.6529
	B2C5	25.1868	22.1467	30.4325	21.4054
	B3C1	6.2046	13.8614	-0.4509	-0.7800
	B3C2	11.7413	6.8278	0.1980	-2.2768
	B3C3	12.9419	13.2031	9.1813	2.8975
	B3C4	6.7699	4.2699	8.0205	-0.9933
	B3C5	7.2798	32.3483	18.6496	10.2446
	B4C1	8.4300	35.5100	29.5572	17.6753
	B4C2	6.6516	43.2763	37.4763	18.9942
	B4C3	8.6882	36.3803	45.0138	22.5251
	B4C4	25.0891	52.7795	53.9054	19.0923
	B4C5	10.2926	69.5974	61.5243	35.6886

Table 49 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
BD	B1D1	4.7157	31.8555	39.0020	18.9441
	B2D1	9.9987	11.6622	29.5773	13.6942
	B3D1	11.2249	15.4500	2.7358	0.1601
	B4D1	12.0367	47.0111	46.3229	24.9568
	B1D2	8.5169	48.1957	43.5206	22.6057
	B2D2	11.5963	17.8626	14.6739	6.3770
	B3D2	6.7501	12.7542	11.5036	3.4767
	B4D2	11.6239	48.0063	44.6679	20.6334
BS	B1S1	8.3537	45.6871	41.8742	21.4329
	B2S1	13.6765	12.5109	19.5427	9.0830
	B3S1	8.5729	12.9103	8.2161	3.3085
	B4S1	15.0396	50.3641	49.8306	22.1760
	B1S2	4.8789	34.3641	40.6484	20.1169
	B2S2	7.9183	17.0139	24.7085	10.9882
	B3S2	9.4021	15.2939	6.0233	0.3283
	B4S2	8.6210	44.6533	41.1602	23.4142
CD	C1D1	5.7182	18.4794	20.5508	9.6684
	C2D1	9.4262	22.0001	17.7091	11.8099
	C3D1	10.5054	22.3702	27.9618	12.6554
	C4D1	10.4772	24.0000	36.2500	10.6392
	C5D1	11.3430	45.6238	44.5758	27.4211
	C1D2	7.4126	24.0004	23.5770	10.2740
	C2D2	8.3654	22.7767	22.1897	9.0343
	C3D2	8.7242	43.8854	27.4946	16.3898
	C4D2	10.3962	30.6032	34.3146	12.1570
	C5D2	13.2106	37.2578	35.3816	18.5109
CS	C1S1	7.8852	22.1994	24.9463	11.7257
	C2S1	8.6271	21.6114	19.7153	9.9769
	C3S1	12.6936	41.0629	27.0261	16.9698
	C4S1	13.9249	31.1119	41.0974	12.0964
	C5S1	13.9227	35.8549	36.5444	19.2317
	C1S2	5.2456	20.2804	19.1815	8.2167
	C2S2	9.1645	23.1654	20.1835	10.8673
	C3S2	6.5360	25.1927	28.4303	12.0754
	C4S2	6.9485	23.4913	29.4672	10.6998
	C5S2	10.6309	47.0267	43.4130	26.7003

Table 49 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
DS	D1S1	9.8500	24.3038	28.0530	12.4604
	D2S1	9.9778	29.5138	27.2350	11.2948
	D1S2	9.1380	28.6856	30.7660	16.4172
	D2S2	9.2658	33.8956	29.9480	15.2516

Table 50

Results of Analyses of Covariance Among Mean Absolute Goal Discrepancy Scores: Discrimination Learning Non-Verbal Task

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	309	408.50	1,860.27	1,616.90	437.51
Regression	39	1,102.67	8,290.33	7,417.65	1,807.07
Error	270	308.23	931.49	779.01	239.69
B	3	373.46	1,942.13	1,123.19	333.62
C	4	265.23	4,248.94**	4,446.02***	1,793.48**
D	1	1.20	1,999.87	49.29	100.09
S	1	977.37	458.03	213.24	5.91
BC	12	635.67*	1,209.15	476.37	96.71
BD	3	233.56	1,263.94	1,961.32	550.51
BS	3	195.34	949.96	550.70	93.53
CD	4	39.11	1,744.43	431.72	362.58
CS	4	127.20	1,456.47	746.77	342.75
DS	1	633.01	3,380.99	1,394.77	1,272.75*
MA	1	9.02	3,387.31	908.06	290.02
CA	1	75.50	11,401.92***	37.93	42.54
IQ	1	26.84	3,715.62*	2,352.96	311.10

* $P < .05$
** $P < .01$
*** $P < .001$

Table 51

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Absolute Goal Discrepancy Scores: Discrimination Learning Non-Verbal Task

Variable	Level of Practice	Comparison	(b_i-b_j) x $\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$z_{.05}^{S}$	$z_{.01}^{S}$	Results
C	A2	C1:C2	8.8961	84.5404	111.0928	C1=C2
		C1:C3	90.5358	92.1704	119.0280	C1=C3
		C1:C4	46.9536	89.1184	115.9760	C1=C4
		C1:C5	156.4748	94.3068	121.4696	C1<C5**
		C2:C3	82.4905	89.1184	115.9760	C2=C3
		C2:C4	38.6864	84.5404	111.0928	C2=C4
		C2:C5	148.8018	92.1704	119.0280	C2<C5**
		C3:C4	44.7519	84.5404	111.0928	C3=C4
		C3:C5	63.8517	84.5404	111.0928	C3=C5
		C4:C5	111.3310	89.1184	115.9760	C4<C5*
C	A3	C1:C2	16.3787	77.3137	101.5964	C1=C2
		C1:C3	43.1381	77.3137	101.5964	C1=C3
		C1:C4	102.3902	81.5004	106.0622	C1<C4*
		C1:C5	138.7682	84.2915	108.8533	C1<C5**
		C2:C3	59.7494	81.5004	106.0622	C2=C3
		C2:C4	120.7315	84.2915	108.8533	C2<C4**
		C2:C5	156.4328	86.2453	111.0862	C2<C5**
		C3:C4	58.0243	77.3137	101.5964	C3=C4
		C3:C5	94.0975	81.5004	106.0622	C3<C5*
		C4:C5	36.9791	77.3137	101.5964	C4=C5
C	A4	C1:C2	3.4929	42.8843	56.3534	C1=C2
		C1:C3	34.6628	46.7547	60.3786	C1=C3
		C1:C4	11.0533	45.2066	58.8305	C1=C4
		C1:C5	100.6587	47.8385	61.6172	C1<C5**
		C2:C3	31.4964	45.2066	58.8305	C2=C3
		C2:C4	7.6853	42.8843	56.3534	C2=C4
		C2:C5	97.9711	46.7547	60.3786	C2<C5**
		C3:C4	23.9993	42.8843	56.3534	C3=C4
		C3:C5	64.8553	42.8843	56.3534	C3<C5**
		C4:C5	91.0360	45.2066	58.8305	C4<C5**

Table 51 (continued)

Vari-able	Level of Practice	Compari-son	$\frac{(b_i-b_j)\ x}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$Z_{.05}S$	$Z_{.01}S$	Results
BC	A1	B2C4:B4C2	7.4280	48.6412	63.9184	B2C4=B4C2
		B2C4:B3C5	7.8970	51.2752	66.7280	B2C4=B3C5
		B2C4:B4C5	8.6382	53.0312	68.4840	B2C4=B4C5
		B2C4:B1C4	11.1344	54.2604	69.8888	B2C4=B1C4
		B2C4:B2C1	12.1416	55.3140	70.9424	B2C4=B2C1
		B2C4:B4C3	14.1337	56.0164	71.8204	B2C4=B4C3
		B2C4:B3C4	12.6229	56.7188	72.6984	B2C4=B3C4
		B2C4:B1C5	15.5136	57.2456	73.2252	B2C4=B1C5
		B2C4:B2C2	13.0389	57.7724	73.7520	B2C4=B2C2
		B2C4:B2C3	25.2538	58.2114	74.2788	B2C4=B2C3
		B2C4:B4C1	28.6368	58.6504	74.8056	B2C4=B4C1
		B2C4:B1C3	29.2479	59.0016	75.2446	B2C4=B1C3
		B2C4:B3C1	32.4295	59.3528	75.6836	B2C4=B3C1
		B2C4:B1C2	47.2511	59.6162	75.9470	B2C4=B1C2
		B2C4:B3C2	49.3956	59.8796	76.2104	B2C4=B3C2
		B2C4:B1C1	48.7752	60.1430	76.5616	B2C4=B1C1
		B2C4:B3C3	51.9440	60.4064	76.9128	B2C4=B3C3
		B2C4:B2C5	80.6052	60.6698	77.1762	B2C4<B2C5**
		B2C4:B4C4	81.8350	60.9332	77.4396	B2C4<B4C4**
		B4C2:B3C5	0.4762	48.6412	63.9184	B4C2=B3C5
		B4C2:B4C5	1.1627	51.2752	66.7280	B4C2=B4C5
		B4C2:B1C4	5.9860	53.0312	68.4840	B4C2=B1C4
		B4C2:B2C1	6.4802	54.2604	69.8888	B4C2=B2C1
		B4C2:B4C3	5.7433	55.3140	70.9424	B4C2=B4C3
		B4C2:B3C4	7.3796	56.0164	71.8204	B4C2=B3C4
		B4C2:B1C5	8.0928	56.7188	72.6984	B4C2=B1C5
		B4C2:B2C2	10.6484	57.2456	73.2252	B4C2=B2C2
		B4C2:B2C3	21.7396	57.7724	73.7520	B4C2=B2C3
		B4C2:B4C1	18.3745	58.2114	74.2788	B4C2=B4C1
		B4C2:B1C3	21.9607	58.6504	74.8056	B4C2=B1C3
		B4C2:B3C1	25.0087	59.0016	75.2446	B4C2=B3C1
		B4C2:B1C2	32.6298	59.3528	75.6836	B4C2=B1C2
		B4C2:B3C2	34.5770	59.6162	75.9470	B4C2=B3C2
		B4C2:B1C1	41.4880	59.8796	76.2104	B4C2=B1C1
		B4C2:B3C3	43.7213	60.1430	76.5616	B4C2=B3C3
		B4C2:B2C5	85.6535	60.4064	76.9128	B4C2<B2C5**
		B4C2:B4C4	77.4304	60.6698	77.1762	B4C2<B4C4**
		B3C5:B4C5	0.7410	48.6412	63.9184	B3C5=B4C5
		B3C5:B1C4	5.5184	51.2752	66.7280	B3C5=B1C4
		B3C5:B2C1	6.1228	53.0312	68.4840	B3C5=B2C1
		B3C5:B4C3	6.3789	54.2604	69.8888	B3C5=B4C3
		B3C5:B3C4	6.0958	55.3140	70.9424	B3C5=B3C4
		B3C5:B1C5	6.2742	56.0164	71.8204	B3C5=B1C5
		B3C5:B2C2	12.4504	56.7188	72.6984	B3C5=B2C2
		B3C5:B2C3	21.2634	57.2456	73.2252	B3C5=B2C3
		B3C5:B4C1	21.2650	57.7724	73.7520	B3C5=B4C1

Table 51(Continued)

Variable	Level of Practice	Comparison	$\frac{(b_i-b_j)}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$ x	$Z_{.05}S$	$Z_{.01}S$	Results
		B3C5:B1C3	21.4930	58.2114	74.2788	B3C5=B1C3
		B3C5:B3C1	20.7336	58.6504	74.8056	B3C5=B3C1
		B3C5:B1C2	39.4963	59.0016	75.2446	B3C5=B1C2
		B3C5:B3C2	35.9390	59.3528	75.6836	B3C5=B3C2
		B3C5:B1C1	41.0204	59.6162	75.9470	B3C5=B1C1
		B3C5:B3C3	37.2262	59.8796	76.2104	B3C5=B3C3
		B3C5:B2C5	71.9874	60.1430	76.5616	B3C5<B2C5*
		B3C5:B4C4	88.9321	60.4064	76.9128	B3C5<B4C4**
		B4C5:B1C4	4.5483	48.6412	63.9184	B4C5=B1C4
		B4C5:B2C1	5.1292	51.2752	66.7280	B4C5=B2C1
		B4C5:B4C3	4.6100	53.0312	68.4840	B4C5=B4C3
		B4C5:B3C4	6.0286	54.2604	69.8888	B4C5=B3C4
		B4C5:B1C5	5.5332	55.3140	70.9424	B4C5=B1C5
		B4C5:B2C2	11.5508	56.0164	71.8204	B4C5=B2C2
		B4C5:B2C3	20.3638	56.7188	72.6984	B4C5=B2C3
		B4C5:B4C1	17.2118	57.2456	73.2252	B4C5=B4C1
		B4C5:B1C3	20.2242	57.7724	73.7520	B4C5=B1C3
		B4C5:B3C1	23.2073	58.2114	74.2788	B4C5=B3C1
		B4C5:B1C2	37.8907	58.6504	74.8056	B4C5=B1C2
		B4C5:B3C2	40.5990	59.0016	75.2446	B4C5=B3C2
		B4C5:B1C1	39.3862	59.3528	75.6836	B4C5=B1C1
BC	A1	B4C5:B3C3	42.3703	59.6162	75.9470	B4C5=B3C3
(Continued)		B4C5:B2C5	69.4242	59.8796	76.2104	B4C5<B2C5*
		B4C5:B4C4	74.4005	60.1430	76.5616	B4C5<B4C4*
		B1C4:B2C1	0.4942	48.6412	63.9184	B1C4=B2C1
		B1C4:B4C3	0.8444	51.2752	66.7280	B1C4=B4C3
		B1C4:B3C4	1.1379	53.0312	68.4840	B1C4=B3C4
		B1C4:B1C5	1.6878	54.2604	69.8888	B1C4=B1C5
		B1C4:B2C2	6.7078	55.3140	70.9424	B1C4=B2C2
		B1C4:B2C3	15.3620	56.0164	71.8204	B1C4=B2C3
		B1C4:B4C1	15.0762	56.7188	72.6984	B1C4=B4C1
		B1C4:B1C3	13.4006	57.2456	73.2252	B1C4=B1C3
		B1C4:B3C1	18.5723	57.7724	73.7520	B1C4=B3C1
		B1C4:B1C2	28.5028	58.2114	74.2788	B1C4=B1C2
		B1C4:B3C2	35.2328	58.6504	74.8056	B1C4=B3C2
		B1C4:B1C1	29.7813	59.0016	75.2446	B1C4=B1C1
		B1C4:B3C3	37.7353	59.3528	75.6836	B1C4=B3C3
		B1C4:B2C5	79.5578	59.6162	75.9470	B1C4<B2C5**
		B1C4:B4C4	68.6291	59.8796	76.2104	B1C4<B4C4*
		B2C1:B4C3	0.3663	48.6412	63.9184	B2C1=B4C3
		B2C1:B3C4	0.9160	51.2752	66.7280	B2C1=B3C4
		B2C1:B1C5	1.4938	53.0312	68.4840	B2C1=B1C5
		B2C1:B2C2	5.4799	54.2604	69.8888	B2C1=B2C2
		B2C1:B2C3	12.7960	55.3140	70.9424	B2C1=B2C3
		B2C1:B4C1	12.4734	56.0164	71.8204	B2C1=B4C1

Table 51 (Continued)

Variable	Level of Practice	Comparison	$(b_i - b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$z_{.05}S$	$z_{.01}S$	Results
BC	A1 (Continued)	B2C1:B1C3	15.4805	56.7188	72.6984	B2C1=B1C3
		B2C1:C3C1	15.1650	57.2456	73.2252	B2C1=B3C1
		B2C1:B1C2	33.4838	57.7724	73.7520	B2C1=B1C2
		B2C1:B3C2	35.3758	58.2114	74.2788	B2C1=B3C2
		B2C1:B1C1	28.5832	58.6504	74.8056	B2C1=B1C1
		B2C1:B3C3	37.2412	59.0016	75.2446	B2C1=B3C3
		B2C1:B2C5	68.4636	59.3528	75.6836	B2C1<B2C5*
		B2C1:B4C4	82.8093	59.6162	75.9470	B2C1<B4C4**
		B4C3:B3C4	0.5331	48.6412	63.9184	B4C3=B3C4
		B4C3:B1C5	1.1006	51.2752	66.7280	B4C3=B1C5
		B4C3:B2C2	5.8473	53.0312	68.4840	B4C3=B2C2
		B4C3:B2C3	12.1648	54.2604	69.8888	B4C3=B2C3
		B4C3:B4C1	12.1661	55.3140	70.9424	B4C3=B4C1
		B4C3:B1C3	11.9929	56.0164	71.8204	B4C3=B1C3
		B4C3:B3C1	17.7118	56.7188	72.6984	B4C3=B3C1
		B4C3:B1C2	33.1175	57.2356	73.2252	B4C3=B1C2
		B4C3:B3C2	34.3723	57.7724	73.7520	B4C3=B3C2
		B4C3:B1C1	33.9935	58.2114	74.2788	B4C3=B1C1
		B4C3:B3C3	30.9329	58.6504	74.8056	B4C3=B3C3
		B4C3:B2C5	78.6814	59.0016	75.2446	B4C3<B2C5**
		B4C3:B4C4	69.6708	59.3528	75.6836	B4C3<B4C4*
		B3C4:B1C5	0.5778	48.6412	63.9184	B3C4=B1C5
		B3C4:B2C2	5.4116	51.2752	66.7280	B3C4=B2C2
		B3C4:B2C3	14.2246	53.0312	68.4840	B3C4=B2C3
		B3C4:B4C1	13.9700	54.2604	69.8888	B3C4=B4C1
		B3C4:B1C3	14.5811	55.3140	70.9424	B3C4=B1C3
		B3C4:B3C1	14.7848	56.0164	71.8204	B3C4=B3C1
		B3C4:B1C2	32.5843	56.7188	72.6984	B3C4=B1C2
		B3C4:B3C2	29.8433	57.2456	73.2252	B3C4=B3C2
		B3C4:B1C1	34.1084	57.7724	73.7520	B3C4=B1C1
		B3C4:B3C3	31.2774	58.2114	74.2788	B3C4=B3C3
		B3C4:B2C5	78.1385	58.6504	74.8056	B3C4<B2C5**
		B3C4:B4C4	67.4610	59.0016	75.2446	B3C4<B4C4*
		B1C5:B2C2	4.8338	48.6412	63.9184	B1C5=B2C2
		B1C5:B2C3	13.6468	51.2752	66.7280	B1C5=B2C3
		B1C5:B4C1	13.4026	53.0312	68.4840	B1C5=B4C1
		B1C5:B1C3	12.0608	54.2604	69.8888	B1C5=B1C3
		B1C5:B3C1	16.9159	55.3140	70.9424	B1C5=B3C1
		B1C5:B1C2	27.5553	56.0164	71.8204	B1C5=B1C2
		B1C5:B3C2	33.8820	56.7188	72.6984	B1C5=B3C2
		B1C5:B1C1	28.8670	57.2456	73.2252	B1C5=B1C1
		B1C5:B3C3	36.4304	57.7724	73.7520	B1C5=B3C3
		B1C5:B2C5	65.5503	58.2114	74.2788	B1C5<B2C5*
		B1C5:B4C4	81.3155	58.6504	74.8056	B1C5<B4C4**
		B2C2:B2C3	7.6323	48.6412	63.9184	B2C2=B2C3
		B2C2:B4C1	8.6558	51.2752	66.7280	B2C2=B4C1
		B2C2:B1C3	9.2669	53.0312	68.4840	B2C2=B1C3

Table 51 (Continued)

Variable	Level of Practice	Comparison	$\frac{(b_i-b_j) \text{ x}}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$Z_{.05}S$	$Z_{.01}S$	Results
BC (Continued)	A1	B2C2:B3C1	12.0821	54.2604	69.8888	B2C2=B3C1
		B2C2:B1C2	22.8759	55.3140	70.9424	B2C2=B1C2
		B2C2:B3C2	24.5500	56.0164	71.8204	B2C2=B3C2
		B2C2:B1C1	28.7942	56.7188	72.6984	B2C2=B1C1
		B2C2:B3C3	31.5966	57.2455	73.2252	B2C2=B3C3
		B2C2:B2C5	62.9837	57.7724	73.7520	B2C2<B2C5*
		B2C2:B4C4	76.4818	58.2114	74.2788	B2C2<B4C4**
		B2C3:B4C1	0.0016	48.6412	63.9184	B2C3=B4C1
		B2C3:B1C3	0.5002	51.2752	66.7280	B2C3=B1C3
		B2C3:B3C1	3.2691	53.0312	68.4840	B2C3=B3C1
		B2C3:B1C2	18.6159	54.2604	69.8888	B2C3=B1C2
		B2C3:B3C2	20.2352	55.3140	70.9424	B2C3=B3C2
		B2C3:B1C1	20.1400	56.0164	71.8204	B2C3=B1C1
		B2C3:B3C3	22.7836	56.7188	72.6984	B2C3=B3C3
		B2C3:B2C5	55.3514	57.2456	73.2252	B2C3=B2C5
		B2C3:B4C4	67.6688	57.7724	73.7520	B2C3<B4C4*
		B4C1:B1C3	0.5996	48.6412	63.9184	B4C1=B1C3
		B4C1:B3C1	2.6916	51.2752	66.7280	B4C1=B3C1
		B4C1:B1C2	18.6143	53.0312	68.4840	B4C1=B1C2
		B4C1:B3C2	19.8692	54.2604	69.8888	B4C1=B3C2
		B4C1:B1C1	16.4426	55.3140	70.9424	B4C1=B1C1
		B4C1:B3C3	22.3717	56.0164	71.8204	B4C1=B3C3
		B4C1:B2C5	63.9123	56.7188	72.6984	B4C1<B2C5*
		B4C1:B4C4	57.1888	57.2456	73.2252	B4C1=B4C4
		B1C3:B3C1	2.5490	48.6412	63.9184	B1C3=B3C1
		B1C3:B1C2	15.1023	51.2752	66.7280	B1C3=B1C2
		B1C3:B3C2	19.2582	53.0312	68.4840	B1C3=B3C2
		B1C3:B1C1	16.3807	54.2604	69.8888	B1C3=B1C1
		B1C3:B3C3	17.7672	55.3140	70.9424	B1C3=B3C3
		B1C3:B2C5	62.1502	56.0164	71.8204	B1C3<B2C5*
		B1C3:B4C4	65.8374	56.7188	72.6984	B1C3<B4C4*
		B3C1:B1C2	15.4057	48.6412	63.9184	B3C1=B1C2
		B3C1:B3C2	14.6932	51.2752	66.7280	B3C1=B3C2
		B3C1:B1C1	13.8228	53.0312	68.4840	B3C1=B1C1
		B3C1:B3C3	16.4927	54.2604	69.8888	B3C1=B3C3
		B3C1:B2C5	60.6448	55.3140	70.9424	B3C1<B2C5*
		B3C1:B4C4	64.3997	56.0164	71.8204	B3C1<B4C4*
		B1C2:B3C2	1.0527	48.6412	63.9184	B1C2=B3C2
		B1C2:B1C1	1.2785	51.2752	66.7280	B1C2=B1C1
		B1C2:B3C3	3.7574	53.0312	68.4840	B1C2=B3C3
		B1C2:B2C5	44.1469	54.2604	69.8888	B1C2=B2C5
		B1C2:B4C4	47.8341	55.3140	70.9424	B1C2=B4C4
		B3C2:B1C1	0.2692	48.6412	63.9184	B3C2=B1C1
		B3C2:B3C3	2.1538	51.2752	66.7280	B3C2=B3C3

Table 51 (Continued)

Vari-able	Level of Practice	Compari-son	$\frac{(b_i-b_j)\ x}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$Z_{.05}^{S}$	$Z_{.01}^{S}$	Results
BC (Continued)	A1	B3C2:B2C5	44.4521	53.0312	68.4840	B3C2=B2C5
		B3C2:B4C4	47.4335	54.2604	69.8888	B3C2=B4C4
		B1C1:B3C3	2.2333	48.6412	63.9184	B1C1=B3C3
		B1C1:B2C5	42.6229	51.2752	66.7280	B1C1=B2C5
		B1C1:B4C4	46.3101	53.0312	68.4840	B1C1=C4C4
		B3C3:B2C5	41.1303	48.6412	63.9184	B3C3=B2C5
		B3C3:B4C4	44.8851	51.2752	66.7280	B3C3=B4C4
		B2C5:B4C4	3.7548	48.6412	63.9184	B2C5=B4C4
DS	A4	D1S1:D2S1	-------[a]	42.8843	56.3534	D1S1=D2S1
		D1S1:D1S2	50.7630	45.2066	58.8305	D1S1<D1S2*
		D1S1:D2S2	-------[b]	46.7547	60.3786	D1S1=D2S2
		D2S1:D1S2	-------[c]	42.8843	56.3534	D2S1=D1S2
		D2S1:D2S2	50.7630	45.2066	58.8305	D2S1<D2S2*
		D1S2:D2S2	-------[d]	42.8843	56.3534	D1S2=D2S2

* $P < .05$

** $P < .01$

[a,b,c,d] The operation involved indeterminate numbers.

Table 52

Mean Positive Goal Discrepancy Scores:
Discrimination Learning Non-Verbal Task

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	4.5943	9.1093	8.3329	5.3333
	B2	8.9142	2.9685	4.2893	2.5470
	B3	5.2479	-0.0738	-0.9558	-1.1297
	B4	10.7764	11.3588	10.0472	7.2626
C	C1	4.7753	3.2128	3.3764	2.2615
	C2	5.7588	4.6513	4.6467	2.2608
	C3	6.2794	7.7759	5.0559	3.1615
	C4	8.6112	5.8245	8.1910	2.7548
	C5	11.4913	7.7390	5.8720	7.0779
D	D1	6.8258	5.0229	5.1874	3.6794
	D2	7.9406	6.6585	5.6694	3.3272
S	S1	9.3172	6.5367	6.0104	3.7230
	S2	5.4492	5.1447	4.8464	3.2836
BC	B1C1	3.7901	6.8112	8.9430	5.2983
	B1C2	8.3943	7.1263	7.8572	4.9677
	B1C3	2.5290	14.1680	7.0524	3.8027
	B1C4	2.9577	9.6997	8.6150	6.8121
	B1C5	5.3004	7.7413	9.1969	5.7857
	B2C1	2.1067	-0.6577	2.0857	-0.0003
	B2C2	5.9724	1.7383	1.1915	0.6103
	B2C3	6.3206	6.8928	5.1619	3.4017
	B2C4	4.6773	2.9212	9.5075	0.9648
	B2C5	25.4940	3.9479	3.4999	7.7565
	B3C1	5.2441	-1.1868	-3.4815	-1.3563
	B3C2	3.6580	-0.5246	0.3681	-2.0505
	B3C3	8.5875	0.1628	-0.8982	-1.3206
	B3C4	3.1144	0.0085	0.8931	-0.8588
	B3C5	5.6355	1.1711	-1.6605	-0.0623
	B4C1	7.9603	7.8845	5.9584	5.1043
	B4C2	5.0105	10.2652	9.1700	5.5157
	B4C3	7.6805	9.8800	8.9075	6.7622
	B4C4	23.6954	10.6686	13.7484	4.1011
	B4C5	9.5353	18.0957	12.4517	14.8297

Table 52(Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
BD	B1D1	3.5962	7.1548	7.9935	4.8653
	B2D1	7.9846	0.5576	5.3938	3.7909
	B3D1	4.8583	-0.1818	-2.1767	-1.3859
	B4D1	10.8641	12.5610	9.5390	7.4473
	B1D2	5.5924	11.0638	8.6723	5.8013
	B2D2	9.8438	5.3794	3.1848	1.3031
	B3D2	5.6375	0.0342	0.2651	-0.8735
	B4D2	10.6887	10.1566	10.5554	7.0779
BS	B1S1	5.3242	10.4289	8.5439	5.9514
	B2S1	11.5644	3.3741	4.4816	2.2739
	B3S1	6.5481	0.2363	-0.9045	-0.8090
	B4S1	13.8321	12.1075	11.9206	7.4757
	B1S2	3.8644	7.7897	8.1219	4.7152
	B2S2	6.2640	2.5629	4.0970	2.8201
	B3S2	3.9477	-0.3839	-1.0071	-1.4504
	B4S2	7.7207	10.6101	8.1738	7.0495
CD	C1D1	3.5113	2.9663	3.2294	2.3689
	C2D1	3.9566	3.8211	3.3021	1.9234
	C3D1	7.5662	4.4892	5.1345	3.7286
	C4D1	8.8841	4.9166	7.7971	2.0965
	C5D1	10.2108	8.9213	6.4739	8.2796
	C1D2	6.0393	3.4595	3.5234	2.1541
	C2D2	7.5610	5.4815	5.9913	2.5982
	C3D2	4.9926	11.0626	4.9773	2.5944
	C4D2	8.3383	6.7324	8.5849	3.4131
	C5D2	12.7718	6.5567	5.2701	5.8762
CS	C1S1	5.7131	3.0614	3.3503	2.3516
	C2S1	7.8273	4.3655	4.8104	2.3911
	C3S1	8.8750	10.6889	5.5933	3.7108
	C4S1	10.6301	7.0740	10.8297	3.1165
	C5S1	13.5405	7.4937	5.4683	7.0450
	C1S2	3.8375	3.3642	3.4025	2.1714
	C2S2	3.6903	4.9371	4.4830	2.1305
	C3S2	3.6838	4.8629	4.5185	2.6122
	C4S2	6.5923	4.5750	5.5523	2.3931
	C5S2	9.4421	7.9843	6.2757	7.1108

Table 52(Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
DS	D1S1	7.9154	4.9984	5.4814	3.6406
	D2S1	9.0302	6.6341	5.9634	3.2884
	D1S2	5.7362	5.0473	4.8934	3.7182
	D2S2	6.8510	6.6829	5.3754	3.3660

Table 53

Results of Analyses of Covariance Among Mean Positive Goal Discrepancy Scores: Discrimination Learning Non-Verbal Task

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	309	349.62	112.85	99.58	47.91
Regression	39	806.51	393.63	310.71	157.08
Error	270	283.63	72.29	69.08	32.14
B	3	566.82	111.52	123.37	80.57
C	4	441.78	233.61*	192.89*	255.21***
D	1	91.57	197.07	17.12	9.14
S	1	1,064.91	137.91	96.44	13.74
BC	12	649.12	86.01	56.29	72.15
BD	3	18.48	201.63*	70.60	42.40
BS	3	83.38	14.75	50.27	9.79
CD	4	99.81	153.97	31.07	32.93
CS	4	20.76	108.73	83.68	3.07
DS	1	201.44	146.65	23.44	18.88
MA	1	1.84	8.95	232.82	18.01
CA	1	47.38	323.39*	22.58	4.23
IQ	1	25.39	25.78	237.65	26.57

* $P < .05$
*** $P < .001$

Table 54

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Positive Goal Discrepancy Scores: Discrimination Learning Non-Verbal Task

Variable	Level of Practice	Comparison	$(b_i - b_j)$ x $\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$z_{.05}S$	$z_{.01}S$	Results
C	A2	C1:C2	11.1426	23.5450	30.9400	C1=C2
		C1:C3	34.7517	26.2650	33.8300	C1<C3**
		C1:C4	20.2302	24.8200	32.3000	C1=C4
		C1:C5	35.0599	25.6700	33.1500	C1<C5**
		C2:C3	24.0004	25.6700	33.1500	C2=C3
		C2:C4	9.2378	23.5450	30.9400	C2=C4
		C2:C5	24.1156	24.8200	32.3000	C2=C5
		C3:C4	14.9889	24.8200	32.3000	C3=C4
		C3:C5	0.2834	23.5450	30.9400	C3=C5
		C4:C5	15.0748	23.5450	30.9400	C4=C5
C	A3	C1:C2	9.8397	23.0187	30.2484	C1=C2
		C1:C3	12.7907	24.2652	31.5780	C1=C3
		C1:C4	37.2939	25.6779	33.0738	C1<C4**
		C1:C5	19.3309	25.0962	32.4090	C1=C5
		C2:C3	3.1431	23.0187	30.2484	C2=C3
		C2:C4	27.9078	25.0962	32.4090	C2<C4*
		C2:C5	9.5698	24.2652	31.5780	C2=C5
		C3:C4	24.0810	24.2652	31.5780	C3=C4
		C3:C5	6.2685	23.0187	30.2484	C3=C5
		C4:C5	18.2598	23.0187	30.2484	C4=C5
C	A4	C1:C2	0.0057	15.7037	20.6359	C1=C2
		C1:C3	6.8537	16.5541	21.5430	C1=C3
		C1:C4	3.8208	15.7037	20.6359	C1=C4
		C1:C5	37.3078	17.1210	22.1099	C1<C5**
		C2:C3	6.9181	17.1210	22.1099	C2=C3
		C2:C4	3.8898	16.5541	21.5430	C2=C4
		C2:C5	37.6228	17.5178	22.5634	C2<C5**
		C3:C4	3.1237	15.7037	20.6337	C3=C4
		C3:C5	30.0828	15.7037	20.6359	C3<C5**
		C4:C5	34.0404	16.5541	21.5430	C4<C5**

Table 54(Continued)

Variable	Level of Practice	Comparison	$(b_i-b_j)\times\sqrt{2}/\sqrt{c_{ii}+c_{jj}-2c_{ij}}$	$z_{.05}S$	$z_{.01}S$	Results
BD	A2	B4D2:B2D1	5.1406	23.5450	30.9400	B4D2=B2D1
		B4D2:B1D1	10.7458	24.8200	32.3000	B4D2=B1D1
		B4D2:B3D2	11.2707	25.6700	33.1500	B4D2=B3D2
		B4D2:B3D1	33.2094	26.2650	33.8300	B4D2<B3D1*
		B4D2:B1D2	26.7855	26.7750	34.3400	B4D2<B1D2*
		B4D2:B2D2	30.8703	27.1150	34.7650	B4D2<B2D2*
		B4D2:B4D1	27.9899	27.4550	35.1900	B4D2<B4D1*
		B2D1:B1D1	3.8995	23.5450	30.9400	B2D1=B1D1
		B2D1:B3D2	10.7458	24.8200	32.3000	B2D1=B3D2
		B2D1:B3D1	19.9438	25.6700	33.1500	B2D1=B3D1
		B2D1:B1D2	33.2094	26.2650	33.8300	B2D1<B1D2*
		B2D1:B2D2	22.3034	26.7750	34.3400	B2D1=B2D2
		B2D1:B4D1	30.8703	27.1150	34.7650	B2D1<B4D1*
		B1D1:B3D2	5.1406	23.5450	30.9400	B1D1=B3C2
		B1D1:B3D1	15.9912	24.8200	32.3000	B1D1=B3D1
		B1D1:B1D2	15.9138	25.6700	33.1500	B1D1=B1D2
		B1D1:B2D2	33.2094	26.2650	33.8300	B1D1<B2D2*
		B1D1:B4D1	26.7855	26.7750	34.3400	B1D1<B4D1*
		B3D2:B3D1	10.1379	23.5450	30.9400	B3D2=B3D1
		B3D2:B1D2	15.9912	24.8200	32.3000	B3D2=B1D2
		B3D2:B2D2	19.9438	25.6700	33.1500	B3D2=B2D2
		B3D2:B4D1	33.2094	26.2650	33.8300	B3D2<B4D1*
		B3D1:B1D2	5.1406	23.5450	30.9400	B3D1=B1D2
		B3D1:B2D2	10.7458	24.8200	32.3000	B3D1=B2D2
		B3D1:B4D1	11.2707	25.6700	33.1500	B3D1=B4D1
		B1D2:B2D2	3.8995	23.5450	30.9400	B1D2=B2D2
		B1D2:B4D1	10.7458	24.8200	32.3000	B1D2=B4D1
		B2D2:B4D1	5.1406	23.5450	30.9400	B2D2=B4D1

* $P < .05$

** $P < .01$

Table 55

Mean Negative Goal Discrepancy Scores:
Discrimination Learning Non-Verbal Task

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	-2.0218	-3.1108	-2.7789	-3.2559
	B2	-1.8831	-1.7652	-2.6757	-2.2932
	B3	-3.7394	-1.9079	-1.9521	-2.1116
	B4	-1.0537	-2.8765	-4.1149	-2.3261
C	C1	-1.7899	-1.7636	-1.4722	-1.5040
	C2	-3.1368	-2.0748	-2.0548	-2.3730
	C3	-3.3352	-3.3069	-3.6354	-3.4215
	C4	-1.8254	-1.7404	-3.4668	-2.1938
	C5	-0.7852	-3.1898	-3.7727	-2.9912
D	D1	-2.6680	-2.2110	-3.2885	-2.5836
	D2	-1.6810	-2.6192	-2.4723	-2.4098
S	S1	-2.0933	-2.4240	-2.9305	-2.6588
	S2	-2.2557	-2.4062	-2.8303	-2.3346
BC	B1C1	-3.3012	-1.0195	-1.0652	-1.9758
	B1C2	-0.7341	-2.7653	-2.5754	-2.1605
	B1C3	-3.8537	-5.4429	-2.9148	-5.5656
	B1C4	-1.1727	-2.0622	-3.5013	-2.5948
	B1C5	-1.0473	-4.2641	-3.8377	-3.9828
	B2C1	-2.4286	-3.3394	-2.1102	-2.3106
	B2C2	-2.0891	-1.2540	-2.3838	-2.9852
	B2C3	-4.1255	-4.0151	-3.6989	-3.2994
	B2C4	-1.0800	-0.3940	-3.1624	-1.4152
	B2C5	+0.3077	+0.1765	-2.0231	-1.4556
	B3C1	-0.9604	-0.8596	-1.0609	-0.6477
	B3C2	-8.0831	-1.3086	-1.0283	-1.5342
	B3C3	-4.3541	-1.3371	-2.5571	-1.8913
	B3C4	-3.6554	-0.1228	-1.2096	-1.6855
	B3C5	-1.6440	-5.9114	-3.9045	-4.7993
	B4C1	-0.4694	-1.8359	-1.6525	-1.0819
	B4C2	-1.6409	-2.9713	-2.2317	-2.8121
	B4C3	-1.0075	-2.4325	-5.3708	-2.9297
	B4C4	-1.3935	-4.3826	-5.9939	-3.0797
	B4C5	-0.7572	-2.7602	-5.3255	-1.7271

Table 55 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
BD	B1D1	-1.1193	-2.8304	-2.9593	-2.9594
	B2D1	-2.0139	-1.2194	-2.9002	-2.3834
	B3D1	-6.3664	-2.3393	-2.0176	-1.9339
	B4D1	-1.1724	-2.4549	-5.0492	-3.0577
	B1D2	-2.9243	-3.3912	-2.5985	-3.5524
	B2D2	-1.7523	-2.3110	-2.4512	-2.2030
	B3D2	-1.1124	-1.4765	-1.8866	-2.2893
	B4D2	-0.9350	-3.2981	-2.9529	-1.5945
BS	B1S1	-3.0293	-3.3276	-2.3981	-3.4192
	B2S1	-2.1120	-1.9293	-3.0135	-2.5807
	B3S1	-2.0245	-1.6668	-1.6342	-2.5620
	B4S1	-1.2074	-2.7723	-4.6762	-2.0733
	B1S2	-1.0143	-2.8940	-3.1597	-3.0926
	B2S2	-1.6542	-1.6011	-2.3379	-2.0057
	B3S2	-5.4543	-2.1490	-2.2700	-1.6612
	B4S2	-0.9000	-2.9807	-3.5536	-2.5789
CD	C1D1	-2.2066	-1.4771	-1.4627	-1.0897
	C2D1	-5.4693	-2.4012	-2.3174	-3.0078
	C3D1	-2.9390	-2.0095	-3.2455	-2.7402
	C4D1	-1.5930	-0.9497	-4.3506	-2.2122
	C5D1	-1.1321	-4.2175	-5.0662	-3.8681
	C1D2	-1.3732	-2.0501	-1.4817	-1.9183
	C2D2	-0.8043	-1.7484	-1.7922	-1.7382
	C3D2	-3.7314	-4.6043	-4.0253	-4.1028
	C4D2	-2.0578	-2.5311	-2.5830	-2.1754
	C5D2	-0.4383	-2.1621	-2.4792	-2.1143
CS	C1S1	-2.1719	-2.2498	-1.2263	-2.2365
	C2S1	-0.7996	-1.8019	-1.9363	-2.2943
	C3S1	-3.8184	-3.8698	-3.3094	-4.1119
	C4S1	-3.2947	-1.7677	-4.3015	-2.0906
	C5S1	-0.3819	-2.4308	-3.8789	-2.5607
	C1S2	-1.4079	-1.2774	-1.7181	-0.7715
	C2S2	-5.4740	-2.3477	-2.1733	-2.4517
	C3S2	-2.8520	-2.7440	-3.9614	-2.7311
	C4S2	-0.3561	-1.7131	-2.6321	-2.2970
	C5S2	-1.1885	-3.9488	-3.6665	-3.4217

Table 55 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
DS	D1S1	-1.9344	-2.1598	-3.4530	-2.4385
	D2S1	-0.9474	-2.5680	-2.6368	-2.2647
	D1S2	-3.4016	-2.2622	-3.1240	-2.7287
	D2S2	-2.4146	-2.6704	-2.3078	-2.5549

Table 56

Results of Analyses of Covariance Among Mean Negative Goal Discrepancy Scores: Discrimination Learning Non-Verbal Task

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	309	58.87	21.59	28.75	23.56
Regression	39	117.26	79.87	90.86	67.00
Error	270	50.44	13.18	19.78	17.29
B	3	27.00	6.27	19.52	11.26
C	4	67.41	35.90*	65.43	32.43
D	1	71.77	12.28	49.09	2.22
S	1	1.88	0.01	0.72	7.48
BC	12	42.04	52.32***	15.12	20.70
BD	3	171.25*	14.37	18.19	14.83
BS	3	97.37	3.40	15.41	6.23
CD	4	71.46	50.04**	27.35	26.23
CS	4	115.32	17.33	12.70	15.55
DS	1	120.27	1.02	3.70	26.66
MA	1	2.71	1.75	4.35	23.87
CA	1	3.26	41.54	6.20	1.01
IQ	1	0.01	9.10	21.14	8.01

* $P < .05$

** $P < .01$

*** $P < .001$

Table 57

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Negative Goal Discrepancy Scores: Discrimination Learning Non-Verbal Task

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$z_{.05}S$	$z_{.01}S$	Results
C	A2	C1:C2	2.4106	10.0562	13.2147	C1=C2
		C1:C3	11.7535	10.9638	14.1586	C1>C3*
		C1:C4	0.1797	10.0562	13.2147	C1=C4
		C1:C5	11.0473	10.6008	13.7955	C1>C5*
		C2:C3	9.4639	10.6008	13.7955	C2=C3
		C2:C4	2.6331	10.6003	13.7955	C2=C4
		C2:C5	8.7084	10.0562	13.2147	C2=C5
		C3:C4	12.0324	11.2179	14.4490	C3<C4*
		C3:C5	0.8995	10.0562	13.2147	C3=C5
		C4:C5	11.4126	10.9638	14.1586	C4>C5*
BC	A2	B3C5:B2C1	5.3081	10.0562	13.2147	B3C5=B2C1
		B3C5:B4C4	5.5452	10.6008	13.7955	B3C5=B4C4
		B3C5:B1C3	9.2936	10.9638	14.1586	B3C5=B1C3
		B3C5:B2C3	9.8987	11.2179	14.4490	B3C5=B2C3
		B3C5:B4C2	14.7828	11.4358	14.6668	B3C5<B4C2**
		B3C5:B1C5	12.4235	11.5810	14.8483	B3C5<B1C5*
		B3C5:B1C2	16.8048	11.7262	15.0299	B3C5<B1C2**
		B3C5:B2C2	17.9896	11.8351	15.1388	B3C5<B2C2**
		B3C5:B3C2	15.9831	11.9440	15.2477	B3C5<B3C2**
		B3C5:B1C4	18.7206	12.0347	15.3566	B3C5<B1C4**
		B3C5:B4C1	19.1442	12.1255	15.4655	B3C5<B4C1**
		B3C5:B3C1	16.2141	12.1981	15.5563	B3C5<B3C1**
		B3C5:B2C4	20.7708	12.2708	15.6470	B3C5<B2C4**
		B3C5:B4C5	17.9581	12.3253	15.1015	B3C5<B4C5**
		B3C5:B3C4	19.8850	12.3797	15.7559	B3C5<B3C4**
		B3C5:B4C3	23.7187	12.4341	15.8285	B3C5<B4C3**
		B3C5:B1C1	24.2589	12.4886	15.9012	B3C5<B1C1**
		B3C5:B3C3	20.9805	12.5431	15.9557	B3C5<B3C3**
		B3C5:B2C5	26.5876	12.5975	16.0101	B3C5<B2C5**
		B2C1:B4C4	0.2371	10.0562	13.2147	B2C1=B4C4
		B2C1:B1C3	4.0810	10.6008	13.7955	B2C1=B1C3
		B2C1:B2C3	3.8797	10.9638	14.1586	B2C1=B2C3
		B2C1:B4C2	9.3041	11.2179	14.4490	B2C1=B4C2
		B2C1:B1C5	9.7735	11.4358	14.6668	B2C1=B1C5
		B2C1:B1C2	11.5923	11.5810	14.8483	B2C1<B1C2*
		B2C1:B2C2	10.9825	11.7262	15.0299	B2C1=B2C2
		B2C1:B3C2	13.1475	11.8351	15.1388	B2C1<B3C2*
		B2C1:B1C4	13.5080	11.9440	15.2477	B2C1<B1C4*
		B2C1:B4C1	11.3975	12.0347	15.3566	B2C1=B4C1
		B2C1:B3C1	11.4311	12.1255	15.4655	B2C1=B3C1

Table 57 (Continued)

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$Z_{.05}^{S}$	$Z_{.01}^{S}$	Results
		B2C1:B2C4	13.3911	12.1981	15.5563	B2C1<B2C4*
		B2C1:B4C5	16.1952	12.2708	15.6470	B2C1<B4C5**
		B2C1:B3C4	17.6530	12.3253	15.7015	B2C1<B3C4**
		B2C1:B4C3	18.5062	12.3797	15.7559	B2C1<B4C3**
		B2C1:B1C1	15.5510	12.4341	15.8285	B2C1<B1C1*
		B2C1:B3C3	19.1650	12.4886	15.9012	B2C1<B3C3**
		B2C1:B2C5	22.6476	12.5431	15.9557	B2C1<B2C5**
		B4C4:B1C3	3.8482	10.0562	13.2147	B4C4=B1C3
		B4C4:B2C3	4.3534	10.6008	13.7955	B4C4=B2C3
		B4C4:B4C2	8.0000	10.9638	14.1586	B4C4=B4C2
		B4C4:B1C5	9.5363	11.2179	14.4490	B4C4=B1C5
		B4C4:B1C2	11.3594	11.4358	14.6668	B4C4=B1C2
		B4C4:B2C2	12.4443	11.5810	14.8483	B4C4<B2C2*
		B4C4:B3C2	12.9104	11.7262	15.0299	B4C4<B3C2*
		B4C4:B1C4	11.1361	11.8351	15.1388	B4C4=B1C4
		B4C4:B4C1	11.4931	11.9440	15.2477	B4C4=B4C1
		B4C4:B3C1	13.6397	12.0347	15.3566	B4C4<B3C1*
		B4C4:B2C4	12.8678	12.1255	15.4655	B4C4<B2C4*
		B4C4:B4C5	13.7379	12.1981	15.5563	B4C4<B4C5*
		B4C4:B3C4	14.3464	12.2708	15.6470	B4C4<B3C4*
		B4C4:B4C3	15.7269	12.3253	15.7015	B4C4<B4C3**
		B4C4:B1C1	18.8135	12.3797	15.7559	B4C4<B1C1**
		B4C4:B3C3	19.2794	12.4341	15.8285	B4C4<B3C3**
BC	A2	B4C4:B2C5	25.9139	12.4886	15.9012	B4C4<B2C5**
(Continued)		B1C3:B2C3	0.3485	10.0562	13.2147	B1C3=B2C3
		B1C3:B4C2	5.2230	10.6008	13.7955	B1C3=B4C2
		B1C3:B1C5	4.7477	10.9638	14.1586	B1C3=B1C5
		B1C3:B1C2	6.3009	11.2179	14.4490	B1C3=B1C2
		B1C3:B2C2	8.3720	11.4358	14.6668	B1C3=B2C2
		B1C3:B3C2	8.8297	11.5810	14.8483	B1C3=B3C2
		B1C3:B1C4	7.9080	11.7262	15.0299	B1C3=B1C4
		B1C3:B4C1	9.3280	11.8351	15.1388	B1C3=B4C1
		B1C3:B3C1	9.3673	11.9440	15.2477	B1C3=B3C1
		B1C3:B2C4	11.1031	12.0347	15.3566	B1C3=B2C4
		B1C3:B4C5	11.8875	12.1255	15.4655	B1C3=B4C5
		B1C3:B3C4	13.2540	12.1981	15.5563	B1C3<B3C4*
		B1C3:B4C3	11.4461	12.2708	15.6470	B1C3=B4C3
		B1C3:B1C1	12.5538	12.3253	15.7015	B1C3<B1C1*
		B1C3:B3C3	12.3158	12.3797	15.7559	B1C3=B3C3
		B1C3:B2C5	21.5990	12.4341	15.8285	B1C3<B2C5**
		B2C3:B4C2	4.8842	10.0562	13.2147	B2C3=B4C2
		B2C3:B1C5	5.1829	10.6008	13.7955	B2C3=B1C5
		B2C3:B1C2	7.0844	10.9638	14.1586	B2C3=B1C2
		B2C3:B2C2	7.0070	11.2179	14.4490	B2C3=B2C2
		B2C3:B3C2	8.5570	11.4358	14.6668	B2C3=B3C2
		B2C3:B1C4	9.0002	11.5810	14.8483	B2C3=B1C4
		B2C3:B4C1	9.0790	11.7262	15.0299	B2C3=B4C1

Table 57 (Continued)

Variable	Level of Practice	Comparison	$\frac{(\bar{b}_i-\bar{b}_j)x}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$Z_{.05}S$	$Z_{.01}S$	Results
		B2C3:B3C1	9.2863	11.8351	15.1388	B2C3=B3C1
		B2C3:B2C4	9.4156	11.9440	15.2477	B2C3=B2C4
		B2C3:B4C5	11.9016	12.0347	15.3566	B2C3=B4C5
		B2C3:B3C4	13.0624	12.1255	15.4655	B2C3<B3C4*
		B2C3:B4C3	11.7427	12.1981	15.5563	B2C3=B4C3
		B2C3:B1C1	14.5385	12.2708	15.6470	B2C3<B1C1*
		B2C3:B3C3	14.9259	12.3253	15.7015	B2C3<B3C3*
		B2C3:B2C5	18.6720	12.3799	15.7559	B2C3<B2C5**
		B4C2:B1C5	0.2988	10.0562	13.2147	B4C2=B1C5
		B4C2:B1C2	1.8683	10.6008	13.7955	B4C2=B1C2
		B4C2:B2C2	2.6416	10.9638	14.1586	B4C2=B2C2
		B4C2:B3C2	3.0255	11.2179	14.4490	B4C2=B3C2
		B4C2:B1C4	4.2040	11.4358	14.6668	B4C2=B1C4
		B4C2:B4C1	3.6860	11.5810	14.8483	B4C2=B4C1
		B4C2:B3C1	4.4021	11.7262	15.0299	B4C2=B3C1
		B4C2:B2C4	5.9880	11.8351	15.1388	B4C2=B2C4
		B4C2:B4C5	5.9308	11.9440	15.2477	B4C2=B4C5
		B4C2:B3C4	8.0310	12.0347	15.3566	B4C2=B3C4
		B4C2:B4C3	7.7194	12.1255	15.4655	B4C2=B4C3
		B4C2:B1C1	9.7423	12.1981	15.5563	B4C2=B1C1
		B4C2:B3C3	9.8609	12.2708	15.6470	B4C2=B3C3
BC (Continued)	A2	B4C2:B2C5	16.6763	12.3253	15.7015	B4C2<B2C5**
		B1C5:B1C2	1.7168	10.0562	13.2147	B1C5=B1C2
		B1C5:B2C2	2.9080	10.6008	13.7955	B1C5=B2C2
		B1C5:B3C2	3.3741	10.9638	14.1586	B1C5=B3C2
		B1C5:B1C4	3.3657	11.2179	14.4490	B1C5=B1C4
		B1C5:B4C1	3.9894	11.4358	14.6668	B1C5=B4C1
		B1C5:B3C1	4.1033	11.5810	14.8483	B1C5=B3C1
		B1C5:B2C4	5.6892	11.7262	15.0299	B1C5=B2C4
		B1C5:B4C5	5.5346	11.8351	15.1388	B1C5=B4C5
		B1C5:B3C4	7.8795	11.9440	15.2477	B1C5=B3C4
		B1C5:B4C3	8.9088	12.0347	15.3566	B1C5=B4C3
		B1C5:B1C1	8.1322	12.1255	15.4655	B1C5=B1C1
		B1C5:B3C3	9.7430	12.1981	15.5563	B1C5=B3C3
		B1C5:B2C5	13.8415	12.2708	15.6470	B1C5<B2C5*
		B1C2:B2C2	0.7221	10.0562	13.2147	B1C2=B2C2
		B1C2:B3C2	1.1060	10.6008	13.7955	B1C2=B3C2
		B1C2:B1C4	1.6071	10.9638	14.1586	B1C2=B1C4
		B1C2:B4C1	1.9946	11.2179	14.4490	B1C2=B4C1
		B1C2:B3C1	2.0346	11.4358	14.6668	B1C2=B3C1
		B1C2:B2C4	3.5919	11.5810	14.8483	B1C2=B2C4
		B1C2:B4C5	4.5168	11.7262	15.0299	B1C2=B4C5
		B1C2:B3C4	5.7428	11.8351	15.1388	B1C2=B3C4
		B1C2:B4C3	6.9140	11.9440	15.2477	B1C2=B4C3
		B1C2:B1C1	6.2530	12.0347	15.3566	B1C2=B1C1
		B1C2:B3C3	7.5727	12.1255	15.4655	B1C2=B3C3

Table 57 (Continued)

Variable	Level of Practice	Comparison	$\frac{(b_i - b_j) \times}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$z_{.05}S$	$z_{.01}S$	Results
BC (Continued)	A2	B1C2:B2C5	14.0878	12.1981	15.5563	B1C2<B2C5*
		B2C2:B3C2	0.3939	10.0562	13.2147	B2C2=B3C2
		B2C2:B1C4	1.0550	10.6008	13.7955	B2C2=B1C4
		B2C2:B4C1	1.1338	10.9658	14.1586	B2C2=B4C1
		B2C2:B3C1	1.1953	11.2179	14.4490	B2C2=B3C1
		B2C2:B2C4	2.4086	11.4358	14.6668	B2C2=B2C4
		B2C2:B4C5	3.8107	11.5810	14.8483	B2C2=B4C5
		B2C2:B3C4	4.9717	11.7262	15.0299	B2C2=B3C4
		B2C2:B4C3	6.0532	11.8351	15.1388	B2C2=B4C3
		B2C2:B1C1	6.5933	11.9440	15.2477	B2C2=B1C1
		B2C2:B3C3	6.8350	12.0347	15.3566	B2C2=B3C3
		B2C2:B2C5	11.6651	12.1255	15.4655	B2C2=B2C5
		B3C2:B1C4	0.5973	10.0562	13.2147	B3C2=B1C4
		B3C2:B4C1	0.6761	10.6008	13.7955	B3C2=B4C1
		B3C2:B3C1	0.6316	10.9638	14.1586	B3C2=B3C1
		B3C2:B2C4	2.3151	11.2179	14.4490	B3C2=B2C4
		B3C2:B4C5	3.3447	11.4358	14.6668	B3C2=B4C5
		B3C2:B3C4	3.9019	11.5810	14.8483	B3C2=B3C4
		B3C2:B4C3	5.5955	11.7262	15.0299	B3C2=B4C3
		B3C2:B1C1	6.1356	11.8351	15.1388	B3C2=B1C1
		B3C2:B3C3	5.3827	11.9440	15.2477	B3C2=B3C3
		B3C2:B2C5	13.2338	12.0347	15.3566	B3C2<B2C5*
		B1C4:B4C1	0.0774	10.0562	13.2147	B1C4=B4C1
		B1C4:B3C1	0.1188	10.6008	13.7955	B1C4=B3C1
		B1C4:B2C4	1.4061	10.9638	14.1586	B1C4=B2C4
		B1C4:B4C5	2.6368	11.2179	14.4490	B1C4=B4C5
		B1C4:B3C4	3.1247	11.4358	14.6668	B1C4=B3C4
		B1C4:B4C3	4.9047	11.5810	14.8483	B1C4=B4C3
		B1C4:B1C1	4.6459	11.7262	15.0299	B1C4=B1C1
		B1C4:B3C3	5.6569	11.8351	15.1388	B1C4=B3C3
		B1C4:B2C5	12.3952	11.9440	15.2477	B1C4<B2C5*
		B4C1:B3C1	0.0336	10.0562	13.2147	B4C1=B3C1
		B4C1:B2C4	1.5973	10.6008	13.7955	B4C1=B2C4
		B4C1:B4C5	2.2448	10.9638	14.1586	B4C1=B4C5
		B4C1:B3C4	3.7482	11.2179	14.4490	B4C1=B3C4
		B4C1:B4C3	4.1267	11.4358	14.6668	B4C1=B4C3
		B4C1:B1C1	4.4576	11.5810	14.8483	B4C1=B1C1
		B4C1:B3C3	5.5781	11.7262	15.0299	B4C1=B3C3
		B4C1:B2C5	12.3150	11.8351	15.1388	B4C1<B2C5*
		B3C1:B2C4	1.5859	10.0562	13.2147	B3C1=B2C4
		B3C1:B4C5	2.5683	10.6008	13.7955	B3C1=B4C5
		B3C1:B3C4	3.1914	10.9638	14.1586	B3C1=B3C4
		B3C1:B4C3	4.8793	11.2179	14.4490	B3C1=B4C3
		B3C1:B1C1	4.4249	11.4358	14.6668	B3C1=B1C1
		B3C1:B3C3	4.7664	11.5810	14.8483	B3C1=B3C3
		B3C1:B2C5	12.2742	11.7262	15.0299	B3C1<B2C5*
		B2C4:B4C5	1.0110	10.0562	13.2147	B2C4=B4C5

Table 57 (Continued)

Vari-able	Level of Practice	Compari-son	$\frac{(\bar{b}_i-b_j)\ x}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$Z_{.05}S$	$Z_{.01}S$	Results
BC (Continued)	**A2**	B2C4:B3C4	1.8511	10.6008	13.7955	B2C4=B3C4
		B2C4:B4C3	3.3220	10.9638	14.1586	B2C4=B4C3
		B2C4:B1C1	3.8622	11.2179	14.4490	B2C4=B1C1
		B2C4:B3C3	4.0538	11.4358	14.6668	B2C4=B3C3
		B2C4:B2C5	9.2564	11.5810	14.8483	B2C4=B2C5
		B4C5:B3C4	1.1399	10.0562	13.2147	B4C5=B3C4
		B4C5:B4C3	1.9387	10.6008	13.7955	B4C5=B4C3
		B4C5:B1C1	2.7979	10.9638	14.1586	B4C5=B1C1
		B4C5:B3C3	2.9698	11.2179	14.4490	B4C5=B3C3
		B4C5:B2C5	7.9565	11.4358	14.6668	B4C5=B2C5
		B3C4:B4C3	1.1712	10.0562	13.2147	B3C4=B4C3
		B3C4:B1C1	1.7113	10.6008	13.7955	B3C4=B1C1
		B3C4:B3C3	1.5749	10.9638	14.1586	B3C4=B3C3
		B3C4:B2C5	8.4980	11.2179	14.4490	B3C4=B2C5
		B4C3:B1C1	0.5300	10.0562	13.2147	B4C3=B1C1
		B4C3:B3C3	0.5526	10.6008	13.7955	B4C3=B3C3
		B4C3:B2C5	7.3054	10.9638	14.1586	B4C3=B2C5
		B1C1:B3C3	0.1186	10.0562	13.2147	B1C1=B3C3
		B1C1:B2C5	6.6337	10.6008	13.7955	B1C1=B2C5
		B3C3:B2C5	6.6345	10.0562	13.2147	B3C3=B2C5
BD	**A1**	B3D1:B1D2	8.8807	19.6670	25.8440	B3D1=B1D2
		B3D1:B4D2	21.3955	20.7320	26.9800	B3D1<B4D2*
		B3D1:B2D1	15.3357	21.4420	27.6900	B3D1=B2D1
		B3D1:B2D2	30.3675	21.9390	28.2580	B3D1<B2D2**
		B3D1:B4D1	21.5771	22.3650	28.6840	B3D1=B4D1
		B3D1:B1D1	30.5665	22.6490	29.0390	B3D1<B1D1**
		B3D1:B3D2	30.4724	22.9330	29.3940	B3D1<B3D2**
		B1D2:B4D2	8.6652	19.6670	25.8440	B1D2=B4D2
		B1D2:B2D1	12.5706	20.7320	26.9800	B1D2=B2D1
		B1D2:B2D2	15.0263	21.4420	27.6900	B1D2=B2D2
		B1D2:B4D1	21.5427	21.9390	28.2580	B1D2=B4D1
		B1D2:B1D1	19.5440	22.3650	28.6840	B1D2=B1D1
		B1D2:B3D2	30.5665	22.6490	29.0390	B1D2<B3D2**
		B4D2:B2D1	0.1457	19.6670	25.8440	B4D2=B2D1
		B4D2:B2D2	6.3012	20.7320	26.9800	B4D2=B2D2
		B4D2:B4D1	5.1934	21.4420	27.6900	B4D2=B4D1
		B4D2:B1D1	21.5427	21.9390	28.2580	B4D2=B1D1
		B4D2:B3D2	21.5771	22.3650	28.6840	B4D2=B3D2

Table 57 (Continued)

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$\tilde{z}_{.05}{}^{S}$	$\tilde{z}_{.01}{}^{S}$	Results
BD (Continued)	A1	B2D1:B2D2	5.0778	19.6670	25.8440	B2D1=B2D2
		B2D1:B4D1	6.3012	20.7320	26.9800	B2D1=B4D1
		B2D1:B1D1	15.0263	21.4420	27.6900	B2D1=B1D1
		B2D1:B3D2	30.3675	21.9390	28.2580	B2D1<B3D2**
		B2D2:B4D1	0.1457	19.6670	25.8440	B2D2=B4D1
		B2D2:B1D1	12.5706	20.7320	26.9800	B2D2=B1D1
		B2D2:B3D2	15.3357	21.4420	27.6900	B2D2=B3D2
		B4D1:B1D1	8.6652	19.6670	25.8440	B4D1=B1D1
		B4D1:B3D2	21.3955	20.7320	26.9800	B4D1<B3D2*
		B1D1:B3D2	8.8807	19.6670	25.8440	B1D1=B3D2
CD	A2	C5D1:C3D2	1.3922	10.0562	13.2147	C5D1=C3D2
		C5D1:C4D2	6.4522	10.6008	13.7955	C5D1=C4D2
		C5D1:C2D1	5.4325	10.9638	14.1586	C5D1=C2D1
		C5D1:C1D2	11.4940	11.2179	14.4490	C5D1<C1D2*
		C5D1:C1D1	10.1801	11.4358	14.6668	C5D1=C1D1
		C5D1:C2D2	17.7110	11.5810	14.8483	C5D1<C2D2**
		C5D1:C4D1	14.3182	11.7262	15.0299	C5D1<C4D1*
		C5D1:C3D1	17.8594	11.8351	15.1388	C5D1<C3D1**
		C5D1:C5D2	15.1869	11.9440	15.2477	C5D1<C5D2*
		C3D2:C4D2	3.9248	10.0562	13.2147	C3D2=C4D2
		C3D2:C2D1	5.5998	10.6008	13.7955	C3D2=C2D1
		C3D2:C1D2	7.7646	10.9638	14.1586	C3D2=C1D2
		C3D2:C1D1	11.6982	11.2179	14.4490	C3D2<C1D1*
		C3D2:C2D2	12.5778	11.4358	14.6668	C3D2<C2D2*
		C3D2:C4D1	16.8827	11.5810	14.8483	C3D2<C4D1**
		C3D2:C3D1	13.3005	11.7262	15.0299	C3D2<C3D1*
		C3D2:C5D2	17.8594	11.8351	15.1388	C3D2<C5D2**
		C4D2:C2D1	0.5639	10.0562	13.2147	C4D2=C2D1
		C4D2:C1D2	3.9054	10.6088	13.7955	C4D2=C1D2
		C4D2:C1D1	6.7236	10.9638	14.1586	C4D2=C1D1
		C4D2:C2D2	8.7247	11.2179	14.4490	C4D2=C2D2
		C4D2:C4D1	7.2321	11.4358	14.6668	C4D2=C4D1
		C4D2:C3D1	16.8827	11.5810	14.8483	C4D2<C3D1**
		C4D2:C5D2	14.3182	11.7262	15.0299	C4D2<C5D2*
		C2D1:C1D2	4.5031	10.0562	13.2147	C2D1=C1D2
		C2D1:C1D1	4.7078	10.6008	13.7955	C2D1=C1D1
		C2D1:C2D2	6.5403	10.9638	14.1586	C2D1=C2D2
		C2D1:C4D1	8.2747	11.2179	14.4490	C2D1=C4D1
		C2D1:C3D1	12.5778	11.4358	14.6668	C2D1<C3D1*
		C2D1:C5D2	17.7110	11.5810	14.8483	C2D1<C5D2**
		C1D2:C1D1	1.0027	10.0562	13.2147	C1D2=C1D1
		C1D2:C2D2	4.7078	10.6008	13.7955	C1D2=C2D2
		C1D2:C4D1	6.7236	10.9638	14.1586	C1D2=C4D1

Table 57 (Continued)

Vari-able	Level of Practice	Compari-son	$\frac{(b_i - b_j)}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$ x	$Z_{.05}S$	$Z_{.01}S$	Results
		C1D2:C3D1	11.6982	11.2179	14.4490	C1D2<C3D1*
		C1D2:C5D2	10.1801	11.4358	14.6668	C1D2=C5D2
		C1D1:C2D2	4.5031	10.0562	13.2147	C1D1=C2D2
		C1D1:C4D1	3.9054	10.6008	13.7955	C1D1=C4D1
		C1D1:C3D1	7.7646	10.9638	14.1586	C1D1=C3D1
CD (Continued)	A2	C1D1:C5D2	11.4940	11.2179	14.4490	C1D1<C5D2*
		C2D2:C4D1	0.5639	10.0562	13.2147	C2D2=C4D1
		C2D2:C3D1	5.5998	10.6008	13.7955	C2D2=C3D1
		C2D2:C5D2	5.4325	10.9638	14.1586	C2D2=C5D2
		C4D1:C3D1	3.9248	10.0562	13.2147	C4D1=C3D1
		C4D1:C5D2	6.4522	10.6008	13.7955	C4D1=C5D2
		C3D1:C5D2	1.3922	10.0562	13.2147	C3D1=C5D2

* $P < .05$
** $P < .01$

TABLE 58

COMPARISON OF THE GROUPS IN TERMS OF DIRECTIONS OF GOAL CHANGE AFTER SUCCESS AND FAILURE: DISCRIMINATION LEARNING NON-VERBAL TASK (FREQUENCIES)

Comparison	Trial 3				Trial 4				Trial 11				Trial 12			
	Direction				Direction				Direction				Direction			
	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T
B1D1C1	7	0	1	8	8	0	0	8	7	0	1	8	8	0	0	8
B1D1C2	6	1	1	8	8	0	0	8	7	0	1	8	7	0	1	8
B1D1C5	2	0	1	3	4	2	0	6	3	1	2	6	3	1	1	5
B1D2C1	6	1	1	8	6	1	1	8	6	1	1	8	7	0	1	8
B1D2C2	7	0	1	8	8	0	0	8	8	0	0	8	7	1	0	8
B1D2C5	5	1	1	7	5	1	0	6	4	1	0	5	5	0	0	5
B2D1C1	7	1	0	8	7	0	1	8	7	0	1	8	7	0	1	8
B2D1C2	7	0	1	8	6	0	2	8	7	0	1	8	5	2	1	8
B2D1C5	5	0	0	5	2	0	1	3	4	0	0	4	4	1	0	5
B2D2C1	5	1	2	8	6	2	0	8	7	0	1	8	6	1	1	8
B2D2C2	6	1	1	8	7	0	1	8	8	0	0	8	6	1	1	8
B2D2C5	5	0	0	5	3	0	0	3	7	0	0	7	3	0	1	4
B3D1C1	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B3D1C2	7	1	0	8	8	0	0	8	7	1	0	8	8	0	0	8
B3D1C5	7	0	0	7	2	0	1	3	5	0	1	6	4	0	1	5
B3D2C1	6	0	2	8	6	0	2	8	6	0	2	8	6	0	2	8
B3D2C2	8	0	0	8	8	0	0	8	8	0	0	8	7	0	1	8
B3D2C5	5	0	0	5	4	0	0	4	6	0	1	7	1	2	1	4
B4D1C1	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B4D1C2	7	0	1	8	8	0	0	8	7	1	0	8	7	0	1	8
B4D1C5	7	0	0	7	3	0	0	3	2	0	2	4	4	0	0	4
B4D2C1	7	0	1	8	8	0	0	8	8	0	0	8	8	0	0	8
B4D2C2	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B4D2C5	4	0	0	4	5	0	0	5	4	0	1	5	2	0	0	2
	Trial 3				Trial 4				Trial 11				Trial 12			
	Direction				Direction				Direction				Direction			
	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T
B1D1C3	3	5	0	8	1	6	1	8	0	7	1	8	0	7	1	8
B1D1C4	1	5	2	8	1	5	2	8	0	7	1	8	0	8	0	8
B1D1C5	1	1	3	5	0	1	1	2	0	1	1	2	0	2	1	3
B1D2C3	0	7	1	8	1	5	2	8	1	6	1	8	0	7	1	8
B1D2C4	3	4	1	8	1	7	0	8	1	7	0	8	1	7	0	8
B1D2C5	1	0	0	1	1	1	0	2	0	0	3	3	0	1	2	3
B2D1C3	0	7	1	8	1	6	1	8	5	3	0	8	1	6	1	8
B2D1C4	1	5	2	8	1	6	1	8	2	4	2	8	2	4	2	8
B2D1C5	1	2	0	3	0	5	0	5	0	4	0	4	1	2	0	3
B2D2C3	0	7	1	8	2	5	1	8	2	5	1	8	1	7	0	8
B2D2C4	0	6	2	8	1	6	1	8	2	6	0	8	1	6	1	8
B2D2C5	0	2	1	3	0	3	2	5	0	0	1	1	0	4	0	4

TABLE 58 --Continued

Comparison	Trial 3				Trial 4				Trial 11				Trial 12			
	Direction				Direction				Direction				Direction			
	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T
B3D1C3	0	6	2	8	0	6	2	8	1	3	3	8	0	5	3	8
B3D1C4	0	7	1	8	2	5	1	8	1	6	1	8	1	7	0	8
B3D1C5	0	1	0	1	1	3	1	5	0	2	0	2	1	2	0	3
B3D2C3	1	5	2	8	1	7	0	8	1	4	3	8	2	6	0	8
B3D2C4	2	6	0	8	0	7	1	8	1	7	0	8	2	6	0	8
B3D2C5	0	3	0	3	0	4	0	4	0	1	0	1	3	1	0	4
B4D1C3	1	6	1	8	1	6	1	8	0	7	1	8	2	6	0	8
B4D1C4	0	7	1	8	0	8	0	8	1	6	1	8	1	7	0	8
B4D1C5	1	0	0	1	1	4	0	5	0	4	0	4	0	4	0	4
B4D2C3	0	6	2	8	1	6	1	8	1	5	2	8	1	3	4	8
B4D2C4	0	8	0	8	2	6	0	8	0	8	0	8	0	7	1	8
B4D2C5	1	3	0	4	0	3	0	3	1	2	0	3	2	3	1	6
	Trial 5				Trial 8				Trial 9				Trial 13			
	Direction				Direction				Direction				Direction			
	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T
B1D1C1	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B1D1C2	6	0	2	8	7	0	1	8	8	0	0	8	6	1	1	8
B1D1C3	7	0	1	8	8	0	0	8	8	0	0	8	8	0	0	8
B1D1C5	4	0	1	5	4	0	2	6	4	0	1	5	2	1	1	4
B1D2C1	6	1	1	8	6	1	1	8	6	1	1	8	6	1	1	8
B1D2C2	8	0	0	8	8	0	0	8	8	0	0	8	6	2	0	8
B1D2C3	7	0	1	8	6	2	0	8	7	1	0	8	7	0	1	8
B1D2C5	3	0	0	3	3	0	1	4	2	1	0	3	6	0	0	6
B2D1C1	7	0	1	8	6	1	1	8	6	1	1	8	7	0	1	8
B2D1C2	6	0	2	8	7	0	1	8	7	0	1	8	6	1	1	8
B2D1C3	7	0	1	8	6	0	2	8	5	2	1	8	7	0	1	8
B2D1C5	5	0	0	5	2	1	0	3	2	2	0	4	3	1	0	4
B2D2C1	7	1	0	8	6	0	2	8	7	0	1	8	7	0	1	8
B2D2C2	6	1	1	8	5	1	2	8	6	1	1	8	7	0	1	8
B2D2C3	5	3	0	8	3	3	2	8	7	1	0	8	5	0	3	8
B2D2C5	4	0	0	4	3	0	0	3	4	0	0	4	2	0	0	2
B3D1C1	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B3D1C2	7	1	0	8	5	1	2	8	8	0	0	8	6	1	1	8
B3D1C3	6	1	1	8	6	0	2	8	5	1	2	8	4	2	2	8
B3D1C5	6	1	0	7	4	2	0	6	3	0	1	4	4	1	1	6
B3D2C1	6	1	1	8	5	1	2	8	6	0	2	8	6	0	2	8
B3D2C2	8	0	0	8	8	0	0	8	8	0	0	8	7	0	1	8
B3D2C3	6	0	2	8	7	0	1	8	6	2	0	8	7	0	1	8
B3D2C5	5	0	1	6	6	1	0	7	2	0	0	2	2	1	0	3
B4D1C1	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B4D1C2	6	0	2	8	8	0	0	8	7	1	0	8	7	0	1	8
B4D1C3	7	1	0	8	8	0	0	8	6	2	0	8	8	0	0	8
B4D1C5	1	0	1	2	6	0	0	6	3	0	0	3	1	1	0	2
B4D2C1	8	0	0	8	8	0	0	8	8	0	0	8	7	0	1	8
B4D2C2	8	0	0	8	7	0	1	8	8	0	0	8	8	0	0	8
B4D2C3	6	0	2	8	8	0	0	8	6	0	2	8	7	0	1	8
B4D2C5	1	0	2	3	3	0	1	4	3	0	1	4	1	0	1	2

TABLE 58—Continued

Comparison	Trial 6				Trial 7				Trial 10				Trial 14			
	Direction				Direction				Direction				Direction			
	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T
B1D1C2	1	6	1	8	1	5	2	8	1	6	1	8	3	3	2	8
B1D1C3	0	4	4	8	1	6	1	8	0	4	4	8	0	7	1	8
B1D1C4	0	6	2	8	0	6	2	8	0	8	0	8	0	7	1	8
B1D1C5	1	1	0	2	0	2	0	2	0	4	1	5	0	3	0	3
B1D2C2	0	6	2	8	1	6	1	8	0	6	2	8	0	5	3	8
B1D2C3	1	6	1	8	4	4	0	8	0	7	1	8	3	4	1	8
B1D2C4	4	3	1	8	1	7	0	8	4	4	0	8	1	6	1	8
B1D2C5	1	2	2	5	1	0	2	3	0	3	1	4	1	2	3	6
B2D1C2	1	6	1	8	0	6	2	8	2	6	0	8	1	6	1	8
B2D1C3	0	6	2	8	0	7	1	8	1	5	2	8	0	7	1	8
B2D1C4	1	6	1	8	2	5	1	8	2	6	0	8	0	5	3	8
B2D1C5	2	5	1	8	2	3	0	5	1	1	0	2	1	4	0	5
B2D2C2	0	6	2	8	1	7	0	8	0	8	0	8	0	8	0	8
B2D2C3	2	3	3	8	0	7	1	8	1	6	1	8	2	5	1	8
B2D2C4	0	6	2	8	1	6	1	8	1	5	2	8	2	6	0	8
B2D2C5	0	4	2	6	2	1	0	3	0	3	0	3	1	5	0	6
B3D1C2	1	6	1	8	0	6	2	8	0	7	1	8	0	8	0	8
B3D1C3	0	6	2	8	0	5	3	8	0	5	3	8	0	5	3	8
B3D1C4	1	6	1	8	0	6	2	8	1	7	0	8	1	7	0	8
B3D1C5	0	1	1	2	0	0	1	1	0	1	0	1	1	1	0	2
B3D2C2	0	5	3	8	0	8	0	8	1	4	3	8	0	6	2	8
B3D2C3	0	6	2	8	1	5	2	8	1	7	0	8	2	5	1	8
B3D2C4	1	4	3	8	0	7	1	8	1	7	0	8	1	7	0	8
B3D2C5	1	1	1	3	0	6	0	6	0	1	0	1	1	2	0	3
B4D1C2	0	6	2	8	1	6	1	8	2	5	1	8	0	7	1	8
B4D1C3	0	8	0	8	1	7	0	8	1	6	1	8	0	8	0	8
B4D1C4	2	5	1	8	1	7	0	8	1	6	1	8	2	6	0	8
B4D1C5	0	2	0	2	1	2	0	3	1	1	0	2	1	3	1	5
B4D2C2	0	7	1	8	0	7	1	8	0	8	0	8	0	8	0	8
B4D2C3	1	6	1	8	2	4	2	8	0	6	2	8	0	5	3	8
B4D2C4	2	6	0	8	1	7	0	8	1	7	0	8	0	8	0	8
B4D2C5	1	2	1	4	0	5	1	6	2	3	0	5	0	2	0	2

TABLE 58 —*Continued*

Comparison	Trial 15				Trial 16				Trial 17			
	Direction				Direction				Direction			
	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T
B1D1C1	8	0	0	8	8	0	0	8	8	0	0	8
B1D1C2	5	1	2	8	6	0	2	8	6	1	1	8
B1D1C3	5	0	3	8	6	0	2	8	7	0	1	8
B1D1C4	8	0	0	8	8	0	0	8	8	0	0	8
B1D1C5	2	3	0	5	3	1	1	5	5	0	1	6
B1D2C1	7	1	0	8	6	2	0	8	6	2	0	8
B1D2C2	7	0	1	8	8	0	0	8	6	0	2	8
B1D2C3	5	1	2	8	7	1	0	8	5	1	2	8
B1D2C4	6	2	0	8	7	1	0	8	5	3	0	8
B1D2C5	3	1	1	5	3	0	0	3	2	0	1	3
B2D1C1	7	1	0	8	7	0	1	8	6	0	2	8
B2D1C2	8	0	0	8	6	2	0	8	6	1	1	8
B2D1C3	5	2	1	8	6	2	0	8	7	1	0	8
B2D1C4	6	1	1	8	6	0	2	8	7	0	1	8
B2D1C5	6	0	0	6	4	0	0	4	4	0	0	4
B2D2C1	5	1	2	8	7	0	1	8	7	0	1	8
B2D2C2	7	1	0	8	7	1	0	8	6	2	0	8
B2D2C3	8	0	0	8	5	0	3	8	7	0	1	8
B2D2C4	6	0	2	8	7	0	1	8	8	0	0	8
B2D2C5	2	0	1	3	4	0	0	4	3	0	0	3
B3D1C1	8	0	0	8	8	0	0	8	8	0	0	8
B3D1C2	5	2	1	8	7	1	0	8	7	1	0	8
B3D1C3	5	0	3	8	5	1	2	8	5	0	3	8
B3D1C4	7	0	1	8	6	1	1	8	7	0	1	8
B3D1C5	4	1	1	6	4	0	1	5	6	0	1	7
B3D2C1	7	0	1	8	7	0	1	8	7	0	1	8
B3D2C2	7	1	0	8	8	0	0	8	8	0	0	8
B3D2C3	7	0	1	8	6	1	1	8	6	0	2	8
B3D2C4	5	1	2	8	7	0	1	8	7	1	0	8
B3D2C5	2	0	2	4	4	0	1	5	3	0	2	5
B4D1C1	8	0	0	8	8	0	0	8	8	0	0	8
B4D1C2	8	0	0	8	6	0	2	8	6	0	2	8
B4D1C3	7	1	0	8	6	2	0	8	7	1	0	8
B4D1C4	7	0	1	8	6	1	1	8	6	1	1	8
B4D1C5	0	1	1	2	3	0	1	4	1	0	1	2
B4D2C1	7	0	1	8	7	0	1	8	8	0	0	8
B4D2C2	8	0	0	8	8	0	0	8	8	0	0	8
B4D2C3	6	0	2	8	7	0	1	8	7	0	1	8
B4D2C4	7	0	1	8	7	0	1	8	8	0	0	8
B4D2C5	2	0	0	2	3	0	0	3	4	0	0	4

Table 59

Mean Attainment Time Scores: Rote Learning Verbal Task--Comparisons Over All B Groups

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	41.8685	34.6123	27.3662	25.6965
	B2	34.4979	19.0298	12.9364	9.4695
	B3	36.2515	20.2085	10.8771	7.5880
C	C1	38.0225	26.2253	17.8725	14.7091
	C2	35.8077	21.4385	14.6801	12.4270
	C3	38.4637	26.9342	19.0277	16.5544
	C4	37.9388	25.4624	18.3752	13.8868
	C5	36.7061	22.5290	15.0262	12.7387
	C6	38.2971	25.1117	17.3776	15.1922
D	D1	37.4501	24.0313	16.3817	13.3467
	D2	37.6286	25.2024	17.7381	15.1560

Table 60

Results of Analyses of Covariance Among Mean Attainment Time Scores: Rote Learning Verbal Task--Comparisons Over All B Groups

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	279	49.3091	110.3011	105.4454	98.1523
Regression	11	167.0185	541.1476	455.0166	488.3893
Error	268	44.4778	92.6170	91.0973	82.1350
B	2	264.5011**	905.8670***	593.5036**	768.3758***
C	5	50.3512	215.6502*	149.2078	112.5805
D	1	2.2111	95.2500	127.7611	227.3222
MA	1	63.9333	98.9333	18.5333	7.0666
CA	1	330.6000**	699.4000**	525.6000*	656.8000**
IQ	1	227.3181*	257.4090	98.7727	96.9090

* P < .05
** P < .01
*** P < .001

Table 61

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Attainment Time Scores: Rote Learning Verbal Task--Comparisons Over All B Groups

Variable	Level of Practice	Comparison	$\frac{(b_i-b_j)\ x}{\sqrt{c_{ii}+c_{jj}-2c_{ij}}}$	$z_{.05}S$	$z_{.01}S$	Results
B	A1	B1:B2	24.4452	19.3596	25.1940	B1>B2*
		B1:B3	5.6169	18.3651	24.1332	B1=B3
		B2:B3	2.4800	18.3651	24.1332	B2=B3
B	A2	B1:B2	51.6809	28.1488	36.6320	B1>B2**
		B1:B3	14.4038	26.7028	35.0896	B1=B3
		B2:B3	1.6669	26.7028	35.0896	B2=B3
B	A3	B1:B2	47.8581	26.4258	34.7256	B1>B2**
		B1:B3	16.4892	27.8568	36.2520	B1=B3
		B2:B3	2.9123	26.4258	34.7256	B2=B3
B	A4	B1:B2	53.8184	25.0962	32.9784	B1>B2**
		B1:B3	18.1085	26.4552	34.4280	B1=B3
		B2:B3	2.6608	25.0962	32.9784	B2=B3
C	A2	C1:C2	32.4655	29.7876	38.3672	C1>C2*
		C1:C3	4.8602	26.7028	35.0896	C1=C3
		C1:C4	5.2304	26.7028	35.0896	C1=C4
		C1:C5	25.0694	29.1128	37.5960	C1=C5
		C1:C6	7.4703	28.1488	36.6320	C1=C6
		C2:C3	37.2737	30.3660	38.9456	C2<C3*
		C2:C4	27.2911	29.1128	37.5960	C2=C4
		C2:C5	7.3154	26.7028	35.0896	C2=C5
		C2:C6	24.6405	28.1488	36.6320	C2=C6
		C3:C4	10.0906	28.1488	36.6320	C3=C4
		C3:C5	30.2009	29.7876	38.3672	C3>C5*
		C3:C6	12.4948	29.1128	37.5960	C3=C6
		C4:C5	19.8949	28.1488	36.6320	C4=C5
		C4:C6	2.3784	26.7028	35.0896	C4=C6
		C5:C6	17.5165	26.7028	35.0896	C5=C6

* $P < .05$

** $P < .01$

Table 62

Mean Attainment Time Scores: Rote Learning Verbal Task--Comparisons Within the B1 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	41.7666	33.1694	25.0711	20.8071
	C2	40.4545	30.4185	23.1415	20.4750
	C3	41.5449	32.2817	25.1755	23.2993
	C4	42.4019	32.3234	26.5961	21.7524
	C5	40.7075	28.9341	19.7813	17.9751
	C6	43.3514	34.7448	27.5406	24.4169
D	D1	41.5239	30.5767	21.3389	17.7056
	D2	41.8851	33.3806	27.7631	25.2030

Table 63

Results of Analyses of Covariance Among Mean Attainment Time Scores: Rote Learning Verbal Task--Comparisons Within the B1 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	90	36.9354	97.1161	123.5994	136.2083
Regression	9	67.6228	203.7806	322.7434	431.0615
Error	81	33.5257	85.2645	101.4723	103.4469
C	5	16.5241	61.7403	113.2133	76.2875
D	1	2.9467	177.5438	932.0253**	1,269.4309*
MA	1	12.3949	1.5652	75.8478	195.7065
CA	1	10.0862	84.[illegible]586	5.3276	0.2241
IQ	1	10.1930	0.6701	35.0608	103.3930

* P < .05
**P < .01

Table 64

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Attainment Time Scores: Rote Learning Verbal Task--Comparisons Within the B1 Group

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$z_{.05}S$	$z_{.01}S$	Results
D	A3	D1:D2	43.0947	27.8385	36.5820	D1<D2**
D	A4	D1:D2	50.2938	28.1155	36.9460	D1<D2**

Table 65

Mean Attainment Time Scores: Rote Learning Verbal Task--Comparisons Within the B2 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	39.7704	26.5496	18.5539	15.6713
	C2	34.7746	19.5387	15.4312	13.1468
	C3	38.9623	26.4202	21.2770	18.6605
	C4	38.6979	26.6291	22.2199	15.7962
	C5	36.0450	21.6279	16.5681	13.6129
	C6	39.1925	25.6420	19.3179	16.9561
D	D1	39.2961	26.1144	20.8016	16.2673
	D2	36.5181	22.6881	16.9377	15.0140

Table 66

Results of Analyses of Covariance Among Mean Attainment Time Scores: Rote Learning Verbal Task--Comparisons Within the B2 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	94	48.2901	102.4947	93.6152	76.8639
Regression	9	68.2174	122.4077	97.1444	40.9388
Error	85	46.1802	100.3862	93.2415	80.6678
C	5	62.6759	145.3640	107.7508	64.0420
D	1	165.3205	251.5013	311.6041	33.6504
MA	1	3.8889	0.0012	23.1025	0.3778
CA	1	9.7036	0.8833	22.3069	0.0980
IQ	1	4.7911	0.0096	18.3205	0.2974

Table 67

Mean Attainment Time Scores: Rote Learning Verbal Task--Comparisons Within the B3 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	36.2281	25.6122	19.4512	16.4577
	C2	36.5111	21.5799	14.5830	11.6551
	C3	40.4895	30.4098	20.7599	16.8745
	C4	36.9421	23.9806	15.7057	13.0982
	C5	37.9108	24.1089	17.3657	14.8682
	C6	36.7961	21.5866	14.4236	12.6726
D	D1	35.6920	21.8985	15.9111	14.1755
	D2	39.2672	27.1942	18.1852	14.3666

Table 68

Results of Analyses of Covariance Among Mean Attainment Time Scores: Rote Learning Verbal Task--Comparisons Within the B3 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	93	52.8065	96.6085	72.5933	56.9025
Regression	9	134.8435	245.4593	121.6937	103.8363
Error	84	44.0169	80.6602	67.3326	51.8738
C	5	37.4380	163.5218	103.1964	68.8782
D	1	293.9788*	645.0110**	118.9466	0.8399
MA	1	216.2849*	240.3846	58.7493	8.3077
CA	1	374.5134**	432.0642*	139.2443	57.0446
IQ	1	275.7363**	321.0354	72.0052	18.3248

Table 69

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Attainment Time Scores: Rote Learning Verbal Task--Comparisons Within the B3 Group

Variable	Level of Practice	Comparison	$(b_i - b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$Z_{.05}^{S}$	$Z_{.01}^{S}$	Results
D	A1	D1:D2	24.2482	18.3651	24.1332	D1<D2**
D	A2	D1:D2	35.9174	24.9300	32.7600	D1<D2**

* $P < .05$
** $P < .01$

Table 70

Mean Attainment Time Scores: Rote Learning Verbal Task--Comparisons of the Three B Groups (MA, CA, and IQ Not Controlled Statistically)

Variable	Variant	Level of Practice (A)			
		A1	A A2	A3	A4
	B1	41.6845	31.9189	24.4443	21.3389
	B2	37.9361	24.4351	18.9197	15.6623
	B3	32.9973	17.4967	7.8157	5.7530

Table 71

Results of Analyses of Covariance Among Mean Attainment Time Scores: Rote Learning Verbal Task--Comparisons of the Three B Groups (MA, CA, and IQ Not Controlled Statistically)

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	279	49.31	110.30	105.45	98.15
Regression	8	160.13	601.08	477.10	445.92
Error	271	46.04	95.81	94.47	87.59
B	2	481.43***	1678.11***	1357.84***	1295.17***

*** P < .001

Table 72

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Attainment Time Scores: Rote Learning Verbal Task--Comparisons of the Three B Groups (MA, CA, and IQ Not Controlled Statistically)

Variable	Level of Practice	Comparison	$\frac{(b_i-b_j)\ x}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$z_{.05}S$	$z_{.01}S$	Results
B	A1	B1:B2	36.15	18.79	24.70	B1>B2**
		B1:B3	31.67	19.81	25.78	B1>B3**
		B2:B3	18.12	18.79	24.70	B2=B3
B	A2	B1:B2	72.11	27.11	35.63	B1>B2**
		B1:B3	52.49	28.58	37.19	B1>B3**
		B2:B3	25.40	27.11	35.63	B2=B3

Table 72 (Continued)

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2}/c_{ii}+c_{jj}-2c_{ij}$	$Z_{.05}S$	$Z_{.01}S$	Results
B	A3	B1:B2	53.21	26.90	35.34	B1>B2**
		B1:B3	60.50	28.35	36.90	B1>B3**
		B2:B3	40.63	26.90	35.34	B2>B3**
B	A4	B1:B2	54.76	25.92	34.07	B1>B2**
		B1:B3	56.75	27.33	35.56	B1>B3**
		B2:B3	36.27	25.92	34.07	B2>B3**

** $P < .01$

*** $P < .001$

Table 73

Mean Number of Responses Scores: Rote Learning Verbal Task

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	137.0502	92.1871	79.5707	48.7968
	B2	111.5692	52.3905	41.1291	23.2403
	B3	119.6036	53.6033	37.7179	21.7816
C	C1	123.1180	69.7057	53.9717	31.4500
	C2	117.9112	60.3665	48.8837	29.3417
	C3	125.5545	71.5587	56.3286	33.8680
	C4	124.3650	66.5419	54.7920	30.7267
	C5	120.0864	62.8011	49.8349	30.4160
	C6	125.4109	65.3879	53.0245	31.8350
D	D1	121.9490	64.5353	50.9547	29.8426
	D2	123.5330	67.5853	54.6571	32.7032
S	S1	120.0609	65.1443	52.5816	31.0446
	S2	125.4211	66.9763	53.0302	31.5013
BC	B1C1	136.4943	95.0202	80.4763	48.1555
	B1C2	132.7884	88.2355	77.1075	47.6807
	B1C3	137.1918	93.5316	81.4168	51.4242
	B1C4	139.9672	92.6787	82.1259	49.1570
	B1C5	134.0553	87.6548	71.7200	45.3524
	B1C6	141.8042	95.9518	84.5778	51.0110
	B2C1	113.3985	56.0763	40.8202	23.7715
	B2C2	103.1927	43.3046	34.8767	21.1328
	B2C3	115.5394	58.0186	44.6184	25.6607
	B2C4	114.1376	56.3575	47.8568	23.1829
	B2C5	106.9074	47.7296	39.3042	22.3254
	B2C6	116.2395	52.8565	39.2985	23.3687
	B3C1	119.4612	58.0207	40.6183	22.4230
	B3C2	117.7524	49.5595	34.6670	19.2116
	B3C3	123.9323	63.0759	42.9507	24.5191
	B3C4	118.9903	50.5896	34.3933	19.8403
	B3C5	119.2963	53.0187	38.4805	23.5703
	B3C6	118.1890	47.3555	35.1972	21.1251

Table 73 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
BD	B1D1	137.6392	89.8827	73.7324	44.5093
	B2D1	114.4691	55.9502	43.8833	23.7503
	B3D1	113.7386	48.3730	35.2485	21.2684
	B1D2	136.4611	94.4915	85.4091	53.0844
	B2D2	108.6693	49.4309	38.3749	22.7304
	B3D2	125.4686	58.8337	40.1873	22.2948
BS	B1S1	133.6889	88.6552	76.7200	47.9136
	B2S1	110.3617	53.1976	42.8289	23.2573
	B3S1	116.1319	53.5802	38.1959	21.9628
	B1S2	140.4114	95.7190	82.4215	49.6801
	B2S2	112.7766	51.5834	39.4293	23.2234
	B3S2	123.0753	53.6265	37.2399	21.6003
CS	C1S1	122.0183	70.7964	56.5339	33.5954
	C2S1	112.4571	58.1929	57.2860	29.3197
	C3S1	123.6286	70.2360	52.3471	30.4950
	C4S1	117.3505	62.7286	50.5529	28.0383
	C5S1	116.5868	60.2410	49.4325	29.3684
	C6S1	128.3239	68.6712	58.2973	35.4506
	C1S2	124.2177	68.6151	51.4096	29.3046
	C2S2	123.3652	62.5402	49.4416	29.3637
	C3S2	127.4803	72.8815	60.3101	37.2411
	C4S2	131.3796	70.3552	59.0311	33.4152
	C5S2	123.5860	65.3611	50.2374	31.4636
	C6S2	122.4979	62.1047	47.7516	28.2194
CD	C1D1	116.3622	65.3107	49.9247	28.5791
	C2D1	123.8261	66.6270	52.6441	31.2310
	C3D1	124.3347	67.5925	53.9878	31.1289
	C4D1	121.2889	63.7212	50.5812	28.1427
	C5D1	117.5158	58.9923	47.3165	28.4393
	C6D1	125.4619	64.9680	51.2741	31.5347
	C1D2	129.3738	74.1008	58.0188	34.3209
	C2D2	111.9963	54.1062	45.1234	27.4524
	C3D2	126.7743	75.5249	58.6694	36.6072
	C4D2	124.5369	69.3626	59.0028	33.3107
	C5D2	122.6570	66.6099	52.3534	32.3927
	C6D2	125.3599	65.8077	54.7749	32.1352

Table 74

Results of Analyses of Covariance Among Mean Number of Responses Scores: Rote Learning Verbal Task

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	278	15,466.3094	4,802.0612	3,175.8093	1,122.8993
Regression	37	113,245.2811	33,342.9054	21,519.0000	7,558.0000
Error	241	454.6000	420.2718	359.6349	134.9378
B	2	3,325.0395**	4,917.9803***	3,947.7526***	1,806.8244*
C	5	423.5794	781.4440	371.9721	105.8311
D	1	168.7548	625.6460	921.8807	550.3140*
S	1	1,832.1269*	213.9991	12.8342	13.2997
PC	10	116.1779	201.4527	212.5044	34.4979
BD	2	1,837.5405*	1,521.2864*	1,639.5933*	560.7625*
BS	2	137.0693	439.8075	460.3406	27.1853
CD	5	771.7750	743.2818	383.7688	159.4502
CS	5	491.6007	275.8631	551.9308	302.5566
MA	1	825.1746	766.1999	493.5540	198.1104
CA	1	3,132.8580**	3,911.9086**	3,640.9736**	1,831.2947*
IQ	1	2,498.2888*	1,269.3917	906.6066	513.2704

* $P < .05$
** $P < .01$
*** $P < .001$

Table 75

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Number of Responses Scores: Rote Learning Verbal Task

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$Z_{.05}S$	$Z_{.01}S$	Results
B	A1	B1:B2	80.5786	62.2544	81.0160	B1>B2*
		B1:B3	39.0123	59.0564	77.6048	B1=B3
		B2:B3	39.3605	59.0564	77.6048	B2=B3
B	A2	B1:B2	125.8488	59.8600	77.9000	B1>B2**
		B1:B3	86.2772	56.7850	74.6200	B1>B3**
		B2:B3	5.9415	56.7850	74.6200	B2=B3
B	A3	B1:B2	121.5639	52.5192	69.0144	B1>B2**
		B1:B3	93.5870	55.3632	72.0480	B1>B3**
		B2:B3	16.7115	52.5192	69.0144	B2=B3

Table 73 (Continued)

Variable	Level of Practice	Comparison	$\frac{(b_i-b_j)\ x}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$z_{.05}S$	$z_{.01}S$	Results
B	A4	B1:B2	80.8173	32.1874	42.2968	B1>B2**
		B1:B3	60.4088	33.9304	44.1560	B1>B3**
		B2:B3	7.1465	32.1874	42.2968	B2=B3
D	A4	D1:D2	33.2366	32.1874	42.2968	D1<D2*
S	A1	S1:S2	60.6444	59.0564	77.6048	S1<S2*
BD	A1	B3D1:B2D2	22.4398	59.0564	77.6048	B3D1=B2D2
		B3D1:B1D2	59.8730	62.2544	81.0160	B3D1=B1D2
		B3D1:B1D1	60.8876	64.3864	83.1480	B3D1=B1D1
		B3D1:B2D1	82.6882	65.8788	84.8536	B3D1<B2D1*
		B3D1:B3D2	83.0489	67.1580	86.1328	B3D1<B3D2*
		B2D2:B1D2	21.6776	59.0564	77.6048	B2D2=B1D2
		B2D2:B1D1	83.0484	62.2544	81.0160	B2D2<B1D1**
		B2D2:B2D1	59.9863	64.3864	83.1480	B2D2=B2D1
		B2D2:B3D2	82.6882	65.8788	84.8536	B2D2<B3D2*
		B1D2:B1D1	22.4396	59.0564	77.6048	B1D2=B1D1
		B1D2:B2D1	83.0484	62.2544	81.0160	B1D2<B2D1**
		B1D2:B3D2	60.8876	64.3864	83.1480	B1D2=B3D2
		B1D1:B2D1	21.6776	59.0564	77.6048	B1D1=B2D1
		B1D1:B3D2	59.8730	62.2544	81.0160	B1D1=B3D2
		B2D1:B3D2	22.4398	59.0564	77.6048	B2D1=B3D2
BD	A2	B2D2:B3D1	12.6631	56.7850	74.6200	B2D2=B3D1
		B2D2:B1D1	60.6585	59.8600	77.9000	B2D2<B1D1*
		B2D2:B1D2	49.3808	61.9100	79.9500	B2D2=B1D2
		B2D2:B3D2	77.2643	63.3450	81.5900	B2D2<B3D2*
		B2D2:B2D1	72.8669	64.5750	82.8200	B2D2<B2D1*
		B3D1:B1D1	27.6034	56.7850	74.6200	B3D1=B1D1
		B3D1:B1D2	72.7292	59.8600	77.9000	B3D1<B1D2*
		B3D1:B3D2	60.6589	61.9100	79.9500	B3D1=B3D2
		B3D1:B2D1	77.2643	63.3450	81.5900	B3D1<B2D1*
		B1D1:B1D2	12.6630	56.7850	74.6200	B1D1=B1D2
		B1D1:B3D2	72.7292	59.8600	77.9000	B1D1<B3D2*
		B1D1:B2D1	49.3808	61.9100	79.9500	B1D1=B2D1
		B1D2:B3D2	27.6034	56.7850	74.6200	B1D2=B3D2
		B1D2:B2D1	60.6585	59.8600	77.9000	B1D2<B2D1*
		B3D2:B2D1	12.6631	56.7850	74.6200	B3D2=B2D1

Table 75 (Continued)

Variable	Level of Practice	Comparison	$\frac{(b_i-b_j)\ x}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$Z_{.05}S$	$Z_{.01}S$	Results
BD	A3	B2D2:B1D1	10.1209	52.5192	69.0144	B2D2=B1D1
		B2D2:B3D1	64.7836	55.3632	72.0430	B2D2<B3D1*
		B2D2:B3D2	49.2795	57.2592	73.9440	B2D2=B3D2
		B2D2:B1D1	80.6048	58.5864	75.4608	B2D2<B1D2**
		B2D2:B2D1	74.8282	59.7240	76.5984	B2D2<B2D1*
		B1D1:B3D1	31.7824	52.5192	69.0144	B1D1=B3D1
		B1D1:B3D2	74.6868	55.3632	72.0480	B1D1<B3D2**
		B1D1:B1D2	64.7832	57.2592	73.9440	B1D1<B1D2*
		B1D1:B2D1	80.6048	58.5864	75.4608	B1D1<B2D1**
		B3D1:B3D2	10.1209	52.5192	69.0144	B3D1=B3D2
		B3D1:B1D2	74.6868	55.3632	72.0430	B3D1<B1D2**
		B3D1:B2D1	49.2795	57.2592	73.9440	B3D1=B2D1
		B3D2:B1D2	31.7824	52.5192	69.0144	B3D2=B1D2
		B3D2:B2D1	64.7836	55.3632	72.0480	B3D2<B2D1*
		B1D2:B2D1	10.1209	52.5192	69.0144	B1D2=B2D1
BD	A4	B1D1:B2D2	15.0131	32.1874	42.2968	B1D1=B2D2
		B1D1:B3D2	31.4646	33.9304	44.1560	B1D1=B3D2
		B1D1:B3D1	35.6070	35.0924	45.3180	B1D1<B3D1*
		B1D1:B2D1	45.0039	35.9058	46.2476	B1D1<B2D1*
		B1D1:B1D2	46.4248	36.6030	46.9448	B1D1<B1D2*
		B2D2:B3D2	9.6521	32.1874	42.2968	B2D2=B3D2
		B2D2:B3D1	46.4250	33.9304	44.1560	B2D2<B3D1**
		B2D2:B2D1	31.5242	35.0924	45.3180	B2D2=B2D1
		B2D2:B1D1	45.0039	35.9058	46.2476	B2D2<B1D2*
		B3D2:B3D1	15.0132	32.1874	42.2968	B3D2=B3D1
		B3D2:B2D1	46.4250	33.9304	44.1560	B3D2<B2D1**
		B3D2:B1D2	35.6070	35.0924	45.3180	B3D2<B1D2*
		B3D1:B2D1	9.6521	32.1874	42.2968	B3D1=B2D1
		B3D1:B1D2	31.4646	33.9304	44.1560	B3D1=B1D2
		B2D1:B1D2	15.0131	32.1874	42.2968	B2D1=B1D2

* $P < .05$
** $P < .01$

Table 76

Mean Absolute Goal Discrepancy Scores:
Rote Learning Verbal Task

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	6.9967	16.4554	9.0188	10.2847
	B2	5.2065	26.6907	42.3267	12.9951
	B3	4.1369	25.5134	35.1523	10.2986
C	C1	6.1366	17.7209	19.6890	11.8074
	C2	3.4154	20.3351	20.9085	11.7395
	C3	5.1839	21.3975	23.8255	10.8506
	C4	6.6516	26.8055	55.1383	11.2609
	C5	5.8460	28.1735	24.6017	10.3056
D	D1	4.8409	23.2793	27.6693	11.2958
	D2	6.0525	22.4937	29.9959	11.0898
S	S1	5.6884	24.5578	32.4916	11.4844
	S2	5.2050	21.2152	25.1736	10.9012
BC	B1C1	7.4520	10.9605	5.8056	11.6142
	B1C2	4.6640	18.4748	10.7759	12.5334
	B1C3	5.4430	22.2362	13.3812	10.9743
	B1C4	14.4863	16.3296	9.3467	10.1328
	B1C5	2.9382	14.2759	5.7846	6.1688
	B2C1	5.6243	16.0552	17.6449	11.6083
	B2C2	2.9532	18.2912	16.7815	10.6974
	B2C3	4.0477	19.5987	25.0691	9.7007
	B2C4	3.0602	36.5035	115.1970	15.4255
	B2C5	10.3471	43.0049	36.9409	17.5436
	B3C1	5.3335	26.1470	35.6165	12.1997
	B3C2	2.6290	24.2393	35.1681	11.9877
	B3C3	6.0610	22.3576	33.0262	11.8768
	B3C4	2.4083	27.5834	40.8712	8.2244
	B3C5	4.2527	27.2397	31.0795	8.9787
BD	B1D1	4.5575	17.8843	2.9451	9.3829
	B2D1	6.1729	27.1119	45.8925	14.3743
	B3D1	3.7923	24.8417	34.1703	10.1302

Table 76 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
BD (Continued)	B1D2	9.4359	15.0265	15.0925	11.1865
	B2D2	4.2401	26.2695	38.7609	11.6159
	B3D2	4.4815	26.1851	36.1343	10.4670
BS	B1S1	7.1600	18.7800	7.6648	9.0781
	B2S1	5.1394	30.8821	56.6577	14.8426
	B3S1	4.7658	24.0213	33.1523	10.5325
	B1S2	6.8334	14.1408	10.3728	11.4913
	B2S2	5.2736	22.4993	27.9957	11.1476
	B3S2	3.5080	27.0055	37.1523	10.0647
CD	C1D1	4.1611	16.7661	19.1586	10.7544
	C2D1	4.2201	19.1181	17.4512	11.9880
	C3D1	5.9782	22.8224	22.0462	10.8587
	C4D1	3.4184	22.1569	53.1123	9.3230
	C5D1	6.4267	35.5330	26.5782	15.3293
	C1D2	8.1121	18.6757	20.2194	12.8604
	C2D2	2.6107	21.5521	24.3658	11.4910
	C3D2	4.3896	19.9726	25.6048	10.8425
	C4D2	9.8848	31.4541	57.1643	13.1988
	C5D2	5.2653	20.8140	22.6252	8.8307
CS	C1S1	6.3023	17.5801	17.1399	12.0574
	C2S1	4.2411	20.6530	20.4847	11.2869
	C3S1	5.2224	26.4786	22.3300	11.5476
	C4S1	5.2764	25.0757	74.8913	10.5686
	C5S1	7.3998	33.0016	27.6421	13.7359
	C1S2	5.9709	17.8617	22.2381	11.5574
	C2S2	2.5897	20.0171	21.3323	12.1921
	C3S2	5.1454	16.3164	25.3510	10.1536
	C4S2	8.0268	28.5353	35.3853	11.9532
	C5S2	4.2922	23.3454	21.5613	10.4241

Table 76 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
DS	D1S1	4.9967	26.2702	37.1621	12.3470
	D2S1	6.2083	25.4846	39.4887	12.1410
	D1S2	4.6851	20.2884	18.1765	10.2446
	D2S2	5.8967	19.5028	20.5031	10.0386

Table 77

Results of Analyses of Covariance Among Mean Absolute Goal Discrepancy Scores: Rote Learning Verbal Task

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	230	133.33	1,378.27	57.07	325.67
Regression	32	335.13	4,581.79	10,729.91	1,036.13
Error	198	100.72	860.52	4,895.76	210.85
B	2	8.09	308.69	3,880.59	87.52
C	4	69.11	867.76	9,874.60	17.15
D	1	81.66	34.33	301.12	2.36
S	1	12.68	606.40	2,906.41	18.46
BC	8	193.77	842.66	7,885.48	163.75
BD	2	214.39	81.48	1,693.27	99.48
BS	2	9.08	606.10	6,083.91	163.85
CD	4	157.09	872.75	180.91	170.58
CS	4	49.29	420.10	3,601.43	37.69
DS	1	1.57	371.06	7,251.75	122.95
MA	1	61.69	17.32	8.55	61.24
CA	1	4.99	67.25	97.88	67.62
IQ	1	6.82	9.28	304.14	71.65

Table 78

Mean Positive Goal Discrepancy Scores:
Rote Learning Verbal Task

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	4.5295	3.2897	2.1016	1.7736
	B2	2.8846	3.6461	4.9472	3.9637
	B3	-0.1979	3.0032	4.9272	2.8439
C	C1	1.9396	1.9053	2.2115	2.6608
	C2	1.3835	3.8299	4.0417	2.2474
	C3	2.2372	3.8628	3.8627	1.6768
	C4	2.7208	3.6756	6.3073	4.7053
	C5	3.7459	3.2914	3.5368	3.0117
D	D1	2.1057	3.5396	3.8546	2.7070
	D2	2.7051	3.0864	4.1294	3.0138
S	S1	3.2381	3.8518	4.5627	3.1361
	S2	1.5727	2.7742	3.4213	2.5847
BC	B1C1	4.0231	2.4920	1.5960	3.0198
	B1C2	4.0925	3.6800	3.5611	1.3145
	B1C3	3.6825	4.4915	2.0725	0.5158
	B1C4	7.8525	2.9495	2.4803	3.6635
	B1C5	2.9970	2.8355	0.7981	0.3544
	B2C1	0.9094	1.4625	0.7547	1.9699
	B2C2	1.0158	2.9995	2.8493	2.0671
	B2C3	3.0881	4.2423	3.9977	2.3203
	B2C4	1.5358	4.3063	11.4450	7.0423
	B2C5	7.8739	5.2199	5.6893	6.4189
	B3C1	0.8863	1.7614	4.2838	2.9927
	B3C2	-0.9578	4.8102	5.7147	3.3606
	B3C3	-0.0590	2.8546	5.5179	2.1943
	B3C4	-1.2259	3.7710	4.9966	3.4101
	B3C5	0.3668	1.8188	4.1230	2.2618
BD	B1D1	3.7763	4.0602	1.9440	1.3585
	B2D1	3.4420	4.2065	5.0836	3.7186
	B3D1	-0.9012	2.3521	4.5362	3.0438

Table 78 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
BD (Continued)	B1D2	5.2827	2.5192	2.2592	2.1886
	B2D2	2.3272	3.0857	4.8168	4.2088
	B3D2	0.5054	3.6543	5.3182	2.6440
BS	B1S1	5.8901	3.9526	2.3121	1.4285
	B2S1	3.8406	4.5572	6.4131	4.6035
	B3S1	-0.0164	3.0456	4.9629	3.3763
	B1S2	3.1689	2.6268	1.8911	2.1187
	B2S2	1.9286	2.7350	3.4813	3.3239
	B3S2	-0.3794	2.9608	4.8915	2.3115
CD	C1D1	1.4118	2.0645	1.8755	2.4443
	C2D1	1.1501	2.9061	3.5210	2.0704
	C3D1	2.1563	4.4724	3.8959	1.8507
	C4D1	1.0780	3.4093	5.6265	2.7545
	C5D1	4.7323	4.8457	4.3541	4.4151
	C1D2	2.4674	1.7461	2.5475	2.8773
	C2D2	1.6169	4.7537	4.5624	2.4244
	C3D2	2.3181	3.2532	3.8295	1.5029
	C4D2	4.3636	3.9419	6.9881	6.6561
	C5D2	2.7595	1.7371	2.7195	1.6083
CS	C1S1	2.4844	2.0428	2.6722	3.4511
	C2S1	1.7168	4.3328	4.4245	2.4892
	C3S1	1.8634	4.7830	3.8116	2.7374
	C4S1	3.9327	3.5764	7.3120	3.1137
	C5S1	6.1940	4.5190	4.5932	5.3911
	C1S2	1.3948	1.7678	1.7508	1.8705
	C2S2	1.0510	3.3270	3.6589	1.9378
	C3S2	2.6110	2.9376	3.9138	2.1860
	C4S2	1.5089	3.7748	5.3026	6.2969
	C5S2	1.2978	2.0638	2.4804	0.6323

Table 78 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
DS	D1S1	2.8083	4.0694	4.9401	3.6733
	D2S1	3.4077	3.6162	5.2149	3.9801
	D1S2	1.4031	3.0098	2.7691	1.7407
	D2S2	2.0025	2.5566	3.0439	2.0475

Table 79

Results of Analyses of Covariance Among Mean Positive Goal Discrepancy Scores: Rote Learning Verbal Task

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Squar A4
Total	230	54.35	38.24	75.42	64.96
Regression	32	96.14	104.00	169.91	111.74
Error	198	47.59	27.61	60.15	57.40
B	2	46.22	3.61	20.15	27.97
C	4	33.97	30.78	98.76	59.60
D	1	19.99	11.43	4.20	5.23
S	1	150.52	63.01	70.70	16.50
BC	8	76.10	18.51	84.67	38.59
BD	2	40.93	44.09	5.27	7.51
BS	2	25.73	14.47	43.41	20.49
CD	4	39.33	37.93	15.59	63.69
CS	4	49.56	12.91	9.47	50.12
DS	1	3.61	0.01	56.46	101.63
MA	1	8.84	0.01	9.13	17.09
CA	1	3.45	2.07	5.68	9.26
IQ	1	6.09	1.51	33.86	2.71

Table 80

Mean Negative Goal Discrepancy Scores:
Rote Learning Verbal Task

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	-2.4669	-1.4696	+0.2060	-2.2638
	B2	-2.3216	-3.1794	-6.0131	-2.0776
	B3	-4.3342	-3.7813	-6.1317	-2.1941
C	C1	-4.1966	-2.5664	-2.0851	-2.0778
	C2	-2.0315	-2.2492	-2.5586	-2.3804
	C3	-2.9463	-2.2230	-3.5590	-2.8713
	C4	-3.9305	-3.3855	-9.1808	-1.6796
	C5	-2.0996	-3.6264	-2.5145	-1.8834
D	D1	-2.7348	-2.7485	-3.5731	-2.0612
	D2	-3.3470	-2.8717	-4.3861	-2.2958
S	S1	-2.4499	-2.8100	-4.5563	-1.8869
	S2	-3.6319	-2.8102	-3.4029	-2.4701
BC	B1C1	-3.4286	-0.7767	+1.4215	-1.5089
	B1C2	-0.5712	-0.9599	+0.0149	-2.9977
	B1C3	-1.7602	-1.6945	-0.9669	-3.0187
	B1C4	-6.6337	-2.1311	+0.5994	-1.7789
	B1C5	+0.0592	-1.7858	-0.0389	-2.0148
	B2C1	-4.7146	-2.4847	-1.8049	-2.4147
	B2C2	-1.9371	-2.5602	-1.3675	-2.1979
	B2C3	-0.9593	-1.2100	-3.7418	-1.9303
	B2C4	-1.5242	-5.2202	-21.4821	-0.8178
	B2C5	-0.2878	-4.4219	-1.6692	-1.5055
	B3C1	-4.4466	-4.4378	-5.8719	-2.3098
	B3C2	-3.5862	-3.2275	-6.3232	-1.9456
	B3C3	-6.1194	-3.7645	-5.9683	-3.6649
	B3C4	-3.6336	-2.8052	-6.6597	-0.9203
	B3C5	-3.8852	-4.6715	-5.8354	-2.1299
BD	B1D1	-0.7809	-1.1344	+1.4573	-1.9998
	B2D1	-2.7306	-3.3187	-6.2121	-2.0843
	B3D1	-4.6929	-3.7924	-5.9645	-2.0995

Table 80 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
BD (Continued)	B1D2	-4.1529	-1.8048	-1.0453	-2.5278
	B2D2	-1.9126	-3.0401	-5.8141	-2.0709
	B3D2	-2.5453	-3.7702	-6.2989	-2.2887
BS	B1S1	-1.2697	-1.5793	+0.4236	-1.6841
	B2S1	-1.2985	-3.1716	-8.1610	-1.7640
	B3S1	-4.7815	-3.6791	-5.9315	-2.2126
	B1S2	-3.6641	-1.3599	-0.0116	-2.8435
	B2S2	-3.3447	-3.1872	-3.8652	-2.3912
	B3S2	-5.9635	-3.8835	-6.3319	-2.1756
CD	C1D1	-2.7489	-2.3202	-1.8223	-1.5317
	C2D1	-3.0696	-2.5145	-2.3789	-3.0021
	C3D1	-3.8215	-2.6488	-3.7095	-3.1559
	C4D1	-2.3401	-2.8793	-9.0731	-1.2480
	C5D1	-1.6939	-3.3797	-0.8317	-1.3683
	C1D2	-5.6443	-2.8126	-2.3479	-2.6239
	C2D2	-0.9934	-1.9839	-2.7383	-1.7587
	C3D2	-2.0711	-1.7972	-3.4085	-2.5867
	C4D2	-5.5209	-3.8917	-9.2885	-2.1112
	C5D2	-2.5053	-3.8731	-4.1473	-2.3985
CS	C1S1	-3.8175	-2.8965	-2.2932	-1.8649
	C2S1	-2.5247	-2.0303	-1.9147	-2.1394
	C3S1	-3.3586	-2.7585	-3.7162	-2.2679
	C4S1	-1.3433	-3.6758	-13.0969	-1.8315
	C5S1	-1.2053	-4.5637	-1.7605	-1.3308
	C1S2	-4.5757	-2.8967	-1.8770	-2.2907
	C2S2	-1.5383	-2.0305	-3.2025	-2.6214
	C3S2	-2.5340	-2.7587	-3.4018	-3.4747
	C4S2	-6.5177	-2.5252	-5.2647	-1.5277
	C5S2	-2.9939	-2.6891	-3.2685	-2.4360

Table 80 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
DS	D1S1	-2.1880	-2.7563	-5.5038	-1.8494
	D2S1	-2.8002	-2.8795	-6.3168	-2.0340
	D1S2	-3.2816	-2.7407	-1.6424	-2.2730
	D2S2	-3.8938	-2.8639	-2.4554	-2.5076

Table 81

Results of Analyses of Covariance Among Mean Negative Goal Discrepancy Scores: Rote Learning Verbal Task

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	230	78.99	22.18	220.08	11.90
Regression	32	137.25	73.36	312.44	41.65
Error	198	69.57	13.91	205.16	7.09
B	2	25.50	5.79	92.81	0.25
C	4	45.27	18.87	390.39	9.92
D	1	20.85	0.84	36.77	3.06
S	1	75.82	0.01	72.21	18.46
BC	8	53.30	17.33	359.71	7.24
BD	2	103.69	4.37	41.25	1.36
BS	2	58.85	0.81	131.53	6.41
CD	4	68.42	6.80	21.83	12.59
CS	4	67.58	15.10	153.71	4.02
DS	1	0.42	0.01	390.65	1.36
MA	1	117.23	38.92	20.14	21.52
CA	1	16.73	0.01	0.11	0.46
IQ	1	0.02	2.34	23.25	3.72

TABLE 82

COMPARISON OF THE GROUPS IN TERMS OF DIRECTIONS OF GOAL CHANGE AFTER SUCCESS AND FAILURE: ROTE LEARNING VERBAL TASK (FREQUENCIES)

Comparison	Trial 9				Trial 10				Trial 17				Trial 18			
	Direction				Direction				Direction				Direction			
	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T
B1D1C1	7	0	1	8	8	0	0	8	8	0	0	8	8	0	0	8
B1D1C2	6	1	1	8	8	0	0	8	7	1	0	8	7	1	0	8
B1D1C5	4	0	0	4	2	0	1	3	4	0	0	4	0	1	0	1
B1D2C1	6	1	1	8	6	1	1	8	8	0	0	8	7	1	0	8
B1D2C2	8	0	0	8	8	0	0	8	6	1	1	8	6	1	1	8
B1D2C5	5	1	2	8	3	0	2	5	1	1	1	3	4	1	0	5
B2D1C1	7	0	1	8	8	0	0	8	6	1	1	8	8	0	0	8
B2D1C2	5	0	3	8	6	0	2	8	7	1	0	8	7	0	1	8
B2D1C5	5	0	0	5	3	0	0	3	5	0	0	5	2	0	1	3
B2D2C1	7	0	1	8	6	1	1	8	7	0	1	8	7	0	1	8
B2D2C2	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B2D2C5	3	0	1	4	3	0	2	5	3	0	2	5	1	3	2	6
B3D1C1	6	0	2	8	6	0	2	8	6	1	1	8	6	1	1	8
B3D1C2	8	0	0	8	7	0	1	8	5	1	2	8	6	0	2	8
B3D1C5	3	1	0	4	5	1	1	7	2	1	0	3	5	1	1	7
B3D2C1	4	1	3	8	7	0	1	8	5	1	2	8	7	0	1	8
B3D2C2	7	0	1	8	8	0	0	8	8	0	0	8	7	1	0	8
B3D2C5	2	0	0	2	5	0	1	6	4	0	1	5	2	1	0	3
	Trial 9				Trial 10				Trial 17				Trial 18			
	Direction				Direction				Direction				Direction			
	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T
B1D1C3	2	3	3	8	1	5	2	8	3	4	1	8	0	6	2	8
B1D1C4	0	7	1	8	0	5	3	8	0	5	3	8	0	6	2	8
B1D1C5	1	2	1	4	0	4	1	5	1	2	1	4	2	5	0	7
B1D2C3	1	6	1	8	1	7	0	8	1	6	1	8	3	5	0	8
B1D2C4	0	6	2	8	1	5	2	8	0	6	2	8	1	4	3	8
B1D2C5	0	0	0	0	0	3	0	3	0	4	1	5	0	2	1	3
B2D1C3	1	4	3	8	0	8	0	8	1	7	0	8	3	5	0	8
B2D1C4	0	7	1	8	0	7	1	8	1	6	1	8	0	7	1	8
B2D1C5	0	3	0	3	0	4	1	5	0	1	2	3	0	4	1	5
B2D2C3	0	6	2	8	1	6	1	8	1	3	4	8	1	4	3	8
B2D3C4	0	6	2	8	0	6	2	8	0	4	4	8	2	6	0	8
B2D2C5	0	4	0	4	0	3	0	3	0	3	0	3	0	2	0	2
B3D1C3	0	8	0	8	0	7	1	8	1	7	0	8	1	6	1	8
B3D1C4	1	6	1	8	2	4	2	8	1	6	1	8	2	5	1	8
B3D1C5	0	2	2	4	0	1	0	1	0	4	1	5	0	1	0	1
B3D2C3	0	8	0	8	0	6	2	8	0	7	1	8	1	5	2	8
B3D2C4	1	7	0	8	0	7	1	8	0	7	1	8	1	5	2	8
B3D2C5	1	4	1	6	1	1	0	2	1	1	1	3	0	3	2	5

TABLE 82 (Continued)

Comparison	Trial 11				Trial 14				Trial 15				Trial 19			
	Direction				Direction				Direction				Direction			
	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T
B1D1C1	7	0	1	8	7	0	1	8	8	0	0	8	8	0	0	8
B1D1C2	5	1	2	8	6	1	1	8	8	0	0	8	7	0	1	8
B1D1C3	7	1	0	8	8	0	0	8	6	1	1	8	8	0	0	8
B1D1C5	4	1	0	5	5	0	0	5	2	0	0	2	3	0	1	4
B1D2C1	6	2	0	8	8	0	0	8	7	1	0	8	8	0	0	8
B1D2C2	6	2	0	8	7	0	1	8	5	1	2	8	6	1	1	8
B1D2C3	7	0	1	8	6	1	1	8	8	0	0	8	8	0	0	8
B1D2C5	1	3	1	5	5	0	2	7	4	1	2	7	3	1	0	4
B2D1C1	7	1	0	8	7	1	0	8	7	1	0	8	6	0	2	8
B2D1C2	7	0	1	8	4	2	2	8	8	0	0	8	5	2	1	8
B2D1C3	7	0	1	8	7	0	1	8	7	1	0	8	7	1	0	8
B2D1C5	3	0	0	3	3	1	1	5	1	0	1	2	6	0	0	6
B2D2C1	5	1	2	8	4	0	4	8	6	0	2	8	7	0	1	8
B2D2C2	7	0	1	8	7	1	0	8	8	0	0	8	8	0	0	8
B2D2C3	6	1	1	8	8	0	0	8	6	1	1	8	6	2	0	8
B2D2C5	6	0	1	7	5	0	1	6	4	1	1	6	4	0	1	5
B3D1C1	6	0	2	8	7	1	0	8	7	0	1	8	6	1	1	8
B3D1C2	7	1	0	8	7	0	1	8	8	0	0	8	7	0	1	8
B3D1C3	6	0	2	8	5	1	2	8	5	0	3	8	6	1	1	8
B3D1C5	4	0	2	6	4	1	1	6	1	1	1	3	3	1	0	4
B3D2C1	7	1	0	8	7	0	1	8	7	1	0	8	5	2	1	8
B3D2C2	8	0	0	8	7	0	1	8	7	1	0	8	7	0	1	8
B3D2C3	7	0	1	8	5	1	2	8	6	0	2	8	8	0	0	8
B3D2C5	4	1	0	5	5	2	0	7	5	0	1	6	3	0	1	4

	Trial 12				Trial 13				Trial 16				Trial 20			
	Direction				Direction				Direction				Direction			
	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T
B1D1C2	0	5	3	8	2	5	1	8	1	6	1	8	1	6	1	8
B1D1C3	1	6	1	8	0	6	2	8	2	6	0	8	0	7	1	8
B1D1C4	0	6	2	8	0	5	3	8	1	6	1	8	1	6	1	8
B1D1C5	1	2	0	3	1	1	1	3	0	4	1	5	0	1	3	4
B1D2C2	1	5	2	8	0	6	2	8	2	3	3	6	0	5	3	8
B1D2C3	1	7	0	8	1	7	0	8	0	7	1	8	2	6	0	8
B1D2C4	0	6	2	8	0	5	3	8	2	4	2	8	2	5	1	8
B1D2C5	0	1	0	1	0	2	0	2	0	0	2	2	0	3	1	4
B2D1C2	0	5	3	8	0	7	1	8	1	5	2	8	2	5	1	8
B2D1C3	0	8	0	8	0	8	0	8	0	8	0	8	1	7	0	8
B2D1C4	1	5	2	8	0	6	2	8	0	7	1	8	0	5	3	8
B2D1C5	1	1	1	3	1	2	2	5	0	1	2	3	0	4	1	5
B2D2C2	0	6	2	8	0	8	0	8	0	8	0	8	0	7	1	8
B2D2C3	0	6	2	8	2	4	2	8	0	6	2	8	1	6	1	8
B2D2C4	0	7	1	8	1	6	1	8	1	6	1	8	1	6	1	8
B2D2C5	0	3	0	3	0	1	0	1	0	3	0	3	0	3	1	4

Table 82

Comparison	Trial 12				Trial 13				Trial 16				Trial 20			
	Direction				Direction				Direction				Direction			
	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T
B3D1C2	0	7	1	8	2	6	0	8	1	6	1	8	0	6	2	8
B3D1C3	0	6	2	8	0	8	0	8	1	4	3	8	0	7	1	8
B3D1C4	1	5	2	8	2	6	0	8	1	6	1	8	2	6	0	8
B3D1C5	0	1	1	2	0	1	1	2	1	0	1	2	0	0	1	1
B3D2C2	0	7	1	8	0	8	0	8	1	7	0	8	1	5	2	8
B3D2C3	0	7	1	8	2	6	0	8	0	5	3	8	1	7	0	8
B3D2C4	0	5	3	8	1	5	2	8	2	5	1	8	1	6	1	8
B3D2C5	0	0	0	0	1	2	1	4	0	3	1	4	0	2	0	2

	Trial 21				Trial 22				Trial 23			
	Direction				Direction				Direction			
	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T
B1D1C1	8	0	0	8	8	0	0	8	8	0	0	8
B1D1C2	7	1	0	8	6	1	1	8	7	1	0	8
B1D1C3	7	0	1	8	6	1	1	8	6	1	1	8
B1D1C4	8	0	0	8	8	0	0	8	8	0	0	8
B1D1C5	2	1	1	4	0	1	1	2	3	1	1	5
B1D2C1	7	1	0	8	8	0	0	8	7	1	0	8
B1D2C2	6	1	1	8	6	1	1	8	5	2	1	8
B1D2C3	6	1	1	8	7	1	0	8	7	1	0	8
B1D2C4	5	2	1	8	7	1	0	8	6	1	1	8
B1D2C5	4	0	1	5	3	1	0	4	4	3	0	7
B2D1C1	7	1	0	8	7	1	0	8	7	1	0	8
B2C1C2	7	1	0	8	6	0	2	8	6	0	2	8
B2D1C3	7	1	0	8	7	0	1	8	7	1	0	8
B2D1C4	6	0	2	8	7	0	1	8	7	0	1	8
B2D1C5	5	1	1	7	4	1	2	7	4	0	1	5
B2D2C1	6	1	1	8	8	0	0	8	6	1	1	8
B2D2C2	8	0	0	8	8	0	0	8	7	1	0	8
B2D2C3	7	0	1	8	6	1	1	8	8	0	0	8
B2D2C4	6	0	2	8	6	1	1	8	7	0	1	8
B2D2C5	2	0	2	4	4	1	3	8	3	0	3	6
B3D1C1	7	0	1	8	6	0	2	8	7	0	1	8
B3D1C2	6	0	2	8	7	0	1	8	7	0	1	8
B3D1C3	4	2	2	8	5	0	3	8	6	0	2	8
B3D1C4	8	0	0	8	8	0	0	8	8	0	0	8
B3D1C5	2	1	1	4	2	1	1	4	2	2	1	5
B3D2C1	7	1	0	8	8	0	0	8	6	1	1	8
B3D2C2	8	0	0	8	7	1	0	8	7	1	0	8
B3D2C3	5	1	2	8	5	1	2	8	6	1	1	8
B3D2C4	8	0	0	8	8	0	0	8	8	0	0	8
B3D2C5	3	0	1	4	6	0	1	7	3	2	1	6

Table 83

Mean Attainment Time Scores: Rote Learning
Non-Verbal Task--Comparisons Over All B Groups

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	125.9629	99.8371	89.5678	91.3333
	B2	85.3076	65.9057	58.8584	58.8794
	B3	73.4216	56.1685	47.4938	46.9005
	B4	127.7008	103.6218	94.2236	94.6275
C	C1	102.5830	81.1177	72.3688	71.9221
	C2	98.9844	78.1400	68.9130	68.8910
	C3	99.0029	79.4413	70.7734	71.4494
	C4	102.9671	79.7137	70.6045	69.3788
	C5	104.1834	82.0548	73.4981	75.0851
	C6	110.8687	87.8022	79.0575	80.8845
D	D1	101.6270	80.0776	71.0965	72.1151
	D2	104.5695	82.6790	73.9752	73.7552

Table 84

Results of Analyses of Covariance Among Mean Attainment Time Scores:
Rote Learning Non-Verbal Task--Comparisons Over All B Groups

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	370	897.5499	539.9660	512.7739	633.3132
Regression	12	6,880.8882	4,920.3498	5,382.4041	7,138.5275
Error	358	696.9911	393.1375	349.5461	415.2613
B	3	4,202.5030***	3,011.8817***	2,509.5467***	2,686.1760***
C	5	1,166.7812	720.3724	776.9092	1,225.9664*
D	1	795.7904	622.0037	761.6654	247.2353
MA	1	17,052.4000***	10,711.0000***	8,025.7000***	10,071.7000***
CA	1	18.7400	68.6000	130.8000	67.4000
IQ	1	9,642.0000***	7,844.2353***	7,726.3529***	9,921.9412***

* P < .05
*** P < .001

Table 85

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Attainment Time Scores: Rote Learning Non-Verbal Task--Comparisons Over All B Groups

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$z_{.05}S$	$z_{.01}S$	Results
B	A1	B1:B2	157.4579	73.1280	96.0960	B1>B2**
		B1:B3	139.0138	77.0880	100.3200	B1>B3**
		B1:B4	15.0503	73.1280	96.0960	B1=B4
		B2:B3	61.7622	73.1280	96.0960	B2=B3
		B2:B4	146.8541	77.0880	100.3200	B2<B4**
		B3:B4	132.9568	79.7280	102.9600	B3<B4**
B	A2	B1:B2	131.4165	54.9014	72.1448	B1>B2**
		B1:B3	115.5914	57.8744	75.3160	B1>B3**
		B1:B4	32.7764	54.9014	72.1448	B1=B4
		B2:B3	50.7002	54.9014	72.1448	B2=B3
		B2:B4	130.6524	57.8744	75.3160	B2<B4**
		B3:B4	116.2858	59.8564	77.2980	B3<B4**
B	A3	B1:B2	118.9373	51.8267	68.1044	B1>B2**
		B1:B3	111.3193	54.6332	71.0980	B1>B3**
		B1:B4	40.3212	51.8267	68.1044	B1=B4
		B2:B3	59.0527	51.8267	68.1044	B2>B3*
		B2:B4	122.5087	54.6332	71.0980	B2<B4**
		B3:B4	114.4648	56.5042	72.9690	B3<B4**
B	A4	B1:B2	125.6940	56.4249	74.1468	B1>B2**
		B1:B3	117.5604	59.4804	77.4060	B1>B3**
		B1:B4	28.5285	56.4249	74.1468	B1=B4
		B2:B3	62.2449	56.4249	74.1468	B2>B3*
		B2:B4	123.8349	59.4804	77.4060	B2<B4**
		B3:B4	116.9073	61.5174	79.4430	B3<B4**

Table 85 (Continued)

Variable	Level of Practice	Comparison	$\frac{(b_i-b_j) \times}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$S_{.05}S$	$S_{.01}S$	Results
C	A4	C1:C2	24.0588	61.5174	79.4430	C1=C2
		C1:C3	3.6926	56.4249	74.1468	C1=C3
		C1:C4	20.3468	59.4804	77.4060	C1=C4
		C1:C5	24.7035	56.4249	74.1468	C1=C5
		C1:C6	71.1371	59.4804	77.4060	C1<C6*
		C2:C3	19.6506	59.4804	77.4060	C2=C3
		C2:C4	3.8714	56.4249	74.1468	C2=C4
		C2:C5	47.9793	62.9433	81.0726	C2=C5
		C2:C6	93.6715	64.1655	82.2948	C2<C6**
		C3:C4	16.1715	56.4249	74.1468	C3=C4
		C3:C5	27.9267	59.4804	77.4060	C3=C5
		C3:C6	73.0848	61.5174	79.4430	C3<C6*
		C4:C5	44.9316	61.5174	79.4430	C4=C5
		C4:C6	90.5961	62.9433	81.0726	C4<C6**
		C5:C6	45.2946	56.4249	74.1468	C5=C6

* $P < .05$

** $P < .01$

Table 86

Mean Attainment Time Scores: Rote Learning Non-Verbal Task--Comparisons Within the B1 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	93.6613	72.5849	61.2358	62.1476
	C2	92.1179	73.4657	63.8501	61.9477
	C3	89.2659	68.1511	59.1761	58.8440
	C4	105.5478	76.1761	64.9131	62.9670
	C5	82.8197	68.8956	61.2525	60.0057
	C6	123.1127	89.9694	72.3832	73.1026
D	D1	103.2858	78.6626	67.5795	68.7247
	D2	92.2326	71.0850	60.0258	57.6135

Table 87

Results of Analyses of Covariance Among Mean Attainment Time Scores: Rote Learning Non-Verbal Task--Comparisons Within the B1 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Squar A4
Total	90	1,121.6170	380.0034	263.1972	323.5516
Regression	9	2,720.1231	1,031.7294	686.8109	1,010.3827
Error	81	944.0052	307.5894	216.1290	249.4592
C	5	3,057.7365*	896.7276	306.0341	364.1322
D	1	2,761.6164	1,295.5921*	1,287.4251*	2,785.6020
MA	1	2,007.2085	1,559.9682*	788.5901	1,421.1135
CA	1	422.2167	614.3500	193.0000	415.4167
IQ	1	1,870.5175	1,786.9808*	1,027.1367*	1,699.0192

* P < .05
** P < .01

Table 88

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Attainment Time Scores: Rote Learning Non-Verbal Task--Comparisons Within the B1 Group

Variable	Level of Practice	Comparison	$\frac{(b_i-b_j) \times}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$Z_{.05}^{S}$	$Z_{.01}^{S}$	Results
C	A1	C1:C2	5.9775	85.0944	111.8208	C1=C2
		C1:C3	15.8480	89.7024	116.7360	C1=C3
		C1:C4	47.5401	85.0944	111.8208	C1=C4
		C1:C5	43.3664	92.7744	119.8080	C1=C5
		C1:C6	114.0654	89.7024	116.7360	C1<C6*
		C2:C3	10.2832	85.0944	111.8208	C2=C3
		C2:C4	52.0140	89.7024	116.7360	C2=C4
		C2:C5	36.0120	89.7024	116.7360	C2=C5
		C2:C6	115.9733	92.7744	119.8080	C2<C6*
		C3:C4	60.9220	92.7744	119.8080	C3=C4
		C3:C5	24.1198	85.0944	111.8208	C3=C5
		C3:C6	122.0381	94.9248	122.2656	C3<C6*
		C4:C5	90.9125	94.9248	122.2655	C4=C5
		C4:C6	68.0289	85.0944	111.8208	C4=C6
		C5:C6	156.0550	96.7680	124.1088	C5<C6**
D	A2	D1:D2	50.8323	48.6135	63.8820	D1>D2*
D	A3	D1:D2	50.6719	40.7190	53.5080	D1>D2*
D	A4	D1:D2	74.5359	43.7106	57.4392	D1>D2**

* $P < .05$
** $P < .01$

Table 89

Mean Attainment Time Scores: Rote Learning
Non-Verbal Task--Comparisons Within the B2 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	103.8453	83.3207	76.4068	73.2629
	C2	102.7462	79.9241	74.0856	75.1270
	C3	104.3366	80.3072	74.1558	75.5013
	C4	93.6249	74.5931	67.6486	65.6314
	C5	112.1343	84.2273	76.1303	82.0118
	C6	106.9062	87.2460	80.6288	84.4715
D	D1	96.3317	76.8408	71.0327	70.7848
	D2	111.5328	80.3654	78.6336	81.2172

Table 90

Results of Analyses of Covariance Among Mean Attainment Time Scores:
Rote Learning Non-Verbal Task--Comparisons Within the B2 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	95	654.0296	303.1809	325.0363	434.1045
Regression	9	1,783.6831	606.0698	654.0120	1,215.3151
Error	86	535.8100	265.2042	290.6036	352.3499
C	5	587.2926	304.2220	288.3001	712.5066
D	1	4,992.9309**	1,960.1910**	1,254.5998*	2,351.6361*
MA	1	399.5299	180.0476	407.6739	314.2269
CA	1	55.7411	45.0306	169.4464	68.5855
IQ	1	318.4144	137.8848	326.3784	257.3108

* $P < .05$
** $P < .01$

Table 91

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Attainment Time Scores: Rote Learning Non-Verbal Task--Comparisons Within the B2 Group

Variable	Level of Practice	Comparison	$(b_i - b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$z_{.05}S$	$z_{.01}S$	Results
D	A1	D1:D2	99.6796	64.1255	84.2660	D1<D2**
D	A2	D1:D2	62.4565	45.0956	59.2592	D1<D2**
D	A3	D1:D2	49.9667	47.2562	62.0984	D1<D2*
D	A4	D1:D2	68.4090	51.9652	68.2864	D1<D2**

* $P < .05$
**$P < .01$

Table 92

Mean Attainment Time Scores: Rote Learning Non-Verbal Task--Comparisons Within the B3 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	118.7174	96.5576	88.9833	92.0899
	C2	108.5381	86.2325	76.1129	78.9019
	C3	115.3126	96.4192	86.4416	88.9234
	C4	113.3266	90.1579	83.4916	86.0136
	C5	116.3314	94.3513	88.8333	91.6499
	C6	118.8384	98.0439	96.0259	101.3330
D	D1	112.0637	90.3274	83.2867	88.4393
	D2	118.2912	96.9267	90.0095	91.1979

Table 93

Results of Analyses of Covariance Among Mean Attainment Time Scores: Rote Learning Non-Verbal Task--Comparisons Within the B3 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	92	874.5469	850.5930	802.7666	981.7807
Regression	9	4,355.1866	3,709.1758	3,033.5282	3,399.5938
Error	83	497.1282	540.6262	560.8768	719.6081
C	5	214.2092	290.4806	624.8114	796.2346
D	1	879.0064	987.1097	1,024.3581	172.4814
MA	1	436.6638	2.8803	35.7550	144.8860
CA	1	191.2973	880.7351	376.6487	266.5514
IQ	1	247.1383	1.6077	92.0064	184.3666

Table 94

Mean Attainment Time Scores: Rote Learning
Non-Verbal Task--Comparisons Within the B4 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	95.0544	74.8481	65.4596	62.4188
	C2	91.0794	72.1149	60.6413	58.5469
	C3	84.7353	71.2108	62.6558	62.4889
	C4	100.2724	76.5110	64.5923	61.3764
	C5	10[illegible].8271	80.4357	67.2366	65.4738
	C6	96.2253	78.8616	69.5158	67.0852
D	D1	97.2703	77.0890	64.6550	62.2795
	D2	94.7943	74.2384	65.3788	63.5171

Table 95

Results of Analyses of Covariance Among Mean Attainment Time Scores:
Rote Learning Non-Verbal Task--Comparisons Within the B4 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	90	749.2512	418.6527	332.8932	306.8800
Regression	9	1,706.2258	1,152.0433	870.0639	818.3910
Error	81	642.9207	337.1648	273.2076	250.0454
C	5	868.4942	187.3398	152.2152	138.4851
D	1	136.3514	180.7313	11.6530	34.0667
MA	1	32.5343	1,404.3343*	1,566.5105*	1,684.5493*
CA	1	1,326.2821	63.3846	156.2564	214.1795
IQ	1	297.3629	880.7923	1,257.6129*	1,430.2833*

* P < .05

Table 97

Mean Attainment Time Scores: Rote Learning Non-Verbal Task--Comparisons of the Four B Groups (MA, CA, and IQ Not Controlled Statistically)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	97.5134	74.7566	63.6820	63.0190
	B2	103.9322	81.6031	74.8426	76.0010
	B3	115.1062	93.5581	86.6377	89.8490
	B4	95.8410	75.5954	64.9813	62.8718

Table 98

Results of Analyses of Covariance Among Mean Attainment Time Scores: Rote Learning Non-Verbal Task--Comparisons of the Four B Groups (MA, CA, and IQ Not Controlled Statistically)

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	370	897.55	539.97	512.77	633.31
Regression	9	2945.18	2674.88	3864.53	5607.64
Error	361	846.50	486.74	429.21	509.30
B	3	7033.04 ***	3608.76***	10438.80***	15216.28***

*** $P < .001$

Table 99

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Attainment Time Scores: Rote Learning Non-Verbal Task--Comparisons of the Four B Groups (MA, CA, and IQ Not Controlled Statistically)

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$Z_{.05}^{S}$	$Z_{.01}^{S}$	Results
B	A1	B1:B2	61.79	80.59	105.90	B1=B2
		B1:B3	168.86	84.95	110.56	B1<B3**
		B1:B4	16.01	80.59	105.90	B1=B4
		B2:B3	108.56	80.59	105.90	B2<B3
		B2:B4	78.39	84.95	110.56	B2=B4
		B3:B4	188.46	87.86	113.47	B3>B4**

Table 99 (Continued)

Vari-able	Level of Practice	Compari-son	(b_i-b_j) x $\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$Z_{.05}S$	$Z_{.01}S$	Results
B	A2	B1:B2	65.94	64.42	83.84	B1<B2*
		B1:B3	180.48	66.63	86.04	B1<B3**
		B1:B4	8.01	61.11	80.31	B1=B4
		B2:B3	116.13	61.11	80.31	B2<B3**
		B2:B4	58.14	61.11	80.31	B2=B4
		B3:B4	175.65	83.84	60.49	B3>B4**
B	A3	B1:B2	107.58	60.49	78.72	B1<B2**
		B1:B3	220.32	62.57	80.80	B1<B3**
		B1:B4	12.01	57.39	75.41	B1=B4
		B2:B3	159.34	57.39	75.41	B2<B3**
		B2:B4	95.54	57.39	75.41	B2>B4**
		B3:B4	211.83	60.49	78.72	B3>B4**
B	A4	B1:B2	125.22	62.51	82.14	B1<B2**
		B1:B3	257.56	65.90	85.75	B1<B3**
		B1:B4	1.33	62.51	82.14	B1=B4
		B2:B3	134.39	62.51	82.14	B2<B3**
		B2:B4	127.23	65.90	85.75	B2>B4**
		B3:B4	263.77	68.15	88.01	B3>B4**

Table 100

Mean Absolute Goal Discrepancy Scores: Rote Learning Non-Verbal Task

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	6.7511	50.5051	41.1617	7.5655
	B2	13.9610	27.9576	37.6580	23.0949
	B3	16.3715	26.7821	44.4316	25.7005
	B4	7.2112	34.3880	25.9775	1.5359
C	C1	9.8133	22.3312	24.0674	10.3199
	C2	7.8420	25.8711	19.5667	11.7207
	C3	9.7243	29.9457	38.4812	14.3574
	C4	13.1555	45.3259	70.8517	18.8109
	C5	14.8334	51.0671	33.5690	17.1621
D	D1	12.1285	36.0311	38.8950	15.9987
	D2	10.0189	33.7853	35.7194	12.9497
S	S1	12.6468	32.6132	35.5847	13.6909
	S2	9.5006	37.2032	39.0297	15.2575
BC	B1C1	1.0496	19.5200	13.9958	5.1152
	B1C2	2.7793	31.8738	13.0635	4.1234
	B1C3	2.5626	57.2181	49.3221	9.0092
	B1C4	6.8717	57.3319	90.6561	7.0456
	B1C5	20.4923	86.5817	38.7710	12.5341
	B2C1	16.2863	18.4707	16.7371	14.1234
	B2C2	11.4527	16.7433	11.8162	20.7753
	B2C3	10.0784	18.1293	50.9650	16.4474
	B2C4	11.8476	44.3063	76.4165	35.4248
	B2C5	20.1400	42.1384	32.3552	28.7037
	B3C1	14.0016	23.9906	40.3148	24.8141
	B3C2	15.2876	25.5222	39.1610	25.9260
	B3C3	17.2804	21.4043	36.0628	25.2888
	B3C4	16.5376	31.9280	72.1860	24.3003
	B3C5	18.7503	31.0654	34.4334	28.1733
	B4C1	7.9157	27.3435	25.2219	-2.7731
	B4C2	1.8484	29.3451	14.2261	-3.9419
	B4C3	8.9758	23.0311	17.5749	6.6843
	B4C4	17.3651	47.7374	44.1482	8.4729
	B4C5	-0.0490	44.4829	28.7164	-0.7627

Table 100 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
BD	B1D1	8.3503	53.1267	45.8916	9.8122
	B2D1	15.3662	29.6226	34.1270	27.5021
	B3D1	17.1717	26.2783	47.6509	26.1419
	B4D1	7.6258	35.0968	27.9105	2.5386
	B1D2	5.1519	47.8835	36.4318	5.3188
	B2D2	12.5558	26.2926	41.1890	20.6877
	B3D2	15.5713	27.2859	41.2123	25.2591
	B4D2	6.7966	33.6792	24.0445	0.5332
BS	B1S1	8.2859	43.1500	43.5303	7.4014
	B2S1	14.3266	27.8584	25.8014	19.9509
	B3S1	16.4677	25.0928	42.1123	24.3986
	B4S1	11.5070	34.3516	30.8948	3.0127
	B1S2	5.2163	57.8602	38.7931	7.7296
	B2S2	13.5954	28.0568	49.5146	26.2389
	B3S2	16.2753	28.4714	46.7509	27.0024
	B4S2	2.9154	34.4244	21.0602	0.0591
CD	C1D1	11.3584	22.9017	23.8943	11.1262
	C2D1	6.9168	26.0863	23.5696	12.6882
	C3D1	10.0346	20.8711	22.6154	13.4300
	C4D1	15.5223	56.8111	96.7091	25.1348
	C5D1	16.8104	53.4853	27.6866	17.6143
	C1D2	8.2682	21.7607	24.2405	9.5136
	C2D2	8.7672	25.6559	15.5638	10.7532
	C3D2	9.4140	39.0203	64.3470	15.2848
	C4D2	10.7887	33.8407	44.9943	12.4870
	C5D2	12.8564	48.6489	39.4514	16.7099
CS	C1S1	11.9620	24.6251	26.4393	10.8983
	C2S1	9.4971	24.9663	22.9637	11.2432
	C3S1	12.4620	22.4739	23.4925	11.8139
	C4S1	13.4153	42.1692	67.3581	16.4977
	C5S1	15.8976	48.8315	37.6699	18.0014
	C1S2	7.6646	20.0373	21.6955	9.7415
	C2S2	6.1869	26.7759	16.1697	12.1982
	C3S2	6.9866	37.4175	53.4699	16.9009
	C4S2	12.8957	48.4826	74.3453	21.1241
	C5S2	13.7692	53.3027	29.4681	16.3228

Table 100 (Continued)

Variable	Variant	Level of Practice (A) A1	A2	A3	A4
DS	D1S1	14.4587	34.3350	40.2921	14.1134
	D2S1	12.3491	32.0892	37.1165	11.0644
	D1S2	9.7983	37.7272	37.4979	17.8840
	D2S2	7.6887	35.4814	34.3223	14.8350

Table 101

Results of Analyses of Covariance Among Mean Absolute Goal Discrepancy Scores: Rote Learning Non-Verbal Task

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	307	451.07	3,073.08	4,825.26	589.00
Regression	39	1,332.15	12,011.65	16,596.06	2,066.75
Error	268	322.85	1,772.32	3,112.34	373.95
B	3	108.70	4,176.62	2,663.12	831.35
C	4	472.40	9,324.25***	24,438.37***	760.55
D	1	322.97	365.99	731.82	674.65
S	1	695.65	1,480.54	833.99	172.47
BC	12	484.86	1,903.14	2,316.73	357.31
BD	3	21.14	133.58	956.05	67.99
BS	3	247.81	834.85	3,833.49	259.98
CD	4	107.68	3,140.38	14,263.35**	464.43
CS	4	51.90	725.68	3,546.85	141.59
DS	1	162.29	101.57	2,755.67	343.87
MA	1	401.73	1,052.56	9,634.22	78.62
CA	1	1.04	4,071.88	13,328.46*	402.28
IQ	1	241.31	1,954.28	12,680.94*	67.91

* $P < .05$
** $P < .01$
*** $P < .001$

Table 102

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Absolute Goal Discrepancy Scores: Rote Learning Non-Verbal Task

Variable	Level of Practice	Comparison	$\frac{(b_i - b_j)}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$ x	$Z_{.05}S$	$Z_{.01}S$	Results
C	A2	C1:C2	28.0977	116.6142	153.2404	C1=C2
		C1:C3	58.9819	122.9291	159.9762	C1=C3
		C1:C4	179.5934	127.1390	164.1861	C1<C4**
		C1:C5	222.5884	130.0859	167.5540	C1<C5**
		C2:C3	31.0309	116.6142	153.2404	C2=C3
		C2:C4	150.6966	122.9712	159.9762	C2<C4*
		C2:C5	191.8874	121.1390	164.1861	C2<C5**
		C3:C4	117.1327	116.6142	153.2404	C3<C4*
		C3:C5	159.4625	122.9712	159.9762	C3<C5*
		C4:C5	43.7238	116.6142	153.2404	C4=C5
C	A3	C1:C2	35.7230	154.5328	203.0683	C1=C2
		C1:C3	111.6496	162.9010	211.9944	C1=C3
		C1:C4	365.3948	168.4798	217.5732	C1<C4**
		C1:C5	73.5990	154.5328	203.0683	C1=C5
		C2:C3	144.0490	168.4798	217.5732	C2=C3
		C2:C4	397.2533	172.3849	222.0362	C2<C4**
		C2:C5	106.6380	162.9010	211.9944	C2=C5
		C3:C4	246.5270	154.5328	203.0683	C3<C4**
		C3:C5	37.0868	154.5328	203.0683	C3=C5
		C4:C5	283.9380	162.9010	211.9944	C4>C5**
CD	A3	C4D2:C3D1	67.8185	154.5328	203.0683	C4D2=C3D1
		C4D2:C5D1	167.1520	162.9010	211.9944	C4D2<C5D1*
		C4D2:C2D2	169.2850	168.4798	217.5732	C4D2<C2D2*
		C4D2:C1D1	223.9600	172.3849	222.0362	C4D2<C1D1**
		C4D2:C1D2	203.3032	175.7322	225.3835	C4D2<C1D2*
		C4D2:C2D1	268.1789	177.9637	228.1729	C4D2<C2D1**
		C4D2:C5D2	245.8571	180.1952	230.9623	C4D2<C5D2**
		C4D2:C3D2	317.7559	181.8689	232.6360	C4D2<C3D2**
		C4D2:C4D1	299.2153	183.5425	234.3096	C4D2<C4D1**
		C3D1:C5D1	76.0313	154.5328	203.0683	C3D1=C5D1
		C3D1:C2D2	148.8737	162.9010	216.9944	C3D1=C2D2
		C3D1:C1D1	120.5377	168.4798	217.5732	C3D1=C1D1
		C3D1:C1D2	191.1821	172.3849	222.0362	C3D1<C1D2*
		C3D1:C2D1	152.6137	175.7322	225.3835	C3D1=C2D1
		C3D1:C5D2	247.9901	177.9637	228.1729	C3D1<C5D2**
		C3D1:C3D2	209.4434	180.1952	230.9623	C3D1<C3D2*
		C3D1:C4D1	317.7559	181.8689	232.6360	C3D1<C4D1**
		C5D1:C2D2	50.2982	154.5328	203.0683	C5D1=C2D2
		C5D1:C1D1	44.2251	162.9010	211.9944	C5D1=C1D1
		C5D1:C1D2	92.3111	168.4798	217.5732	C5D1=C1D2
		C5D1:C2D1	76.5721	172.3849	222.0362	C5D1=C2D1

Table 102 (Continued)

Vari- able	Level of Practice	Compari- son	$\frac{(b_i - b_j) \times}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$Z_{.05}S$	$Z_{.01}S$	Results
CD	A3 (Continued)	C5D1:C5D2	90.8802	175.7322	225.3835	C5D1=C5D2
		C5D1:C3D2	247.9901	177.9637	228.1729	C5D1<C3D2**
		C5D1:C4D1	245.8571	180.1952	230.9623	C5D1<C4D1**
		C2D2:C1D1	6.5752	154.5328	203.0683	C2D2=C1D1
		C2D2:C1D2	32.3470	162.9010	211.9944	C2D2=C1D2
		C2D2:C2D1	29.3813	168.4798	217.5732	C2D2=C2D1
		C2D2:C5D2	76.5721	172.3849	222.0362	C2D2=C5D2
		C2D2:C3D2	152.6137	175.7322	225.3835	C2D2=C3D2
		C2D2:C4D1	268.1789	177.9637	228.1729	C2D2<C4D1**
		C1D1:C1D2	21.7092	154.5328	203.0683	C1D1=C1D2
		C1D1:C2D1	32.3470	162.9010	211.9944	C1D1=C2D1
		C1D1:C5D2	92.3111	168.4798	217.5732	C1D1=C5D2
		C1D1:C3D2	191.1821	172.3849	222.0362	C1D1<C3D2*
		C1D1:C4D1	203.3032	175.7322	225.3835	C1D1<C4D1*
		C1D2:C2D1	6.5752	154.5328	203.0683	C1D2=C2D1
		C1D2:C5D2	44.2251	162.9010	211.9944	C1D2=C5D2
		C1D2:C3D2	120.5377	168.4798	217.5732	C1D2=C3D2
		C1D2:C4D1	223.9600	172.3849	222.0362	C1D2<C4D1**
		C2D1:C5D2	50.2982	154.5328	203.0683	C2D1=C5D2
		C2D1:C3D2	148.8737	162.9010	211.9944	C2D1=C3D2
		C2D1:C4D1	169.2850	168.4798	217.5732	C2D1<C4D1*
		C5D2:C3D2	76.0313	154.5328	203.0683	C5D2=C3D2
		C5D2:C4D1	167.1520	162.9010	211.9944	C5D2<C4D1*
		C3D2:C4D1	67.8185	154.5328	203.0683	C3D2=C4D1

* $P < .05$
** $P < .01$

Table 103

Mean Positive Goal Discrepancy Scores:
Rote Learning Non-Verbal Task

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	7.1567	8.4483	17.7255	1.9195
	B2	12.8927	2.6960	-1.7960	4.5898
	B3	13.1586	2.1069	-3.6894	4.1688
	B4	7.6456	9.6732	14.5331	2.0715
C	C1	9.5264	3.7697	3.6680	2.5706
	C2	7.6374	5.1715	3.4699	2.2551
	C3	8.4816	4.8668	4.6531	3.1857
	C4	11.1954	7.6763	14.5987	3.1106
	C5	14.2262	7.1712	7.0768	4.8150
D	D1	11.3316	5.7768	8.7022	3.4220
	D2	9.0952	5.6854	4.6844	2.9528
S	S1	11.9312	6.1787	8.7767	3.5100
	S2	8.4956	5.2835	4.6099	2.8648
BC	B1C1	1.4555	4.9129	8.2333	2.5028
	B1C2	3.9204	7.2781	9.1676	1.4118
	B1C3	1.0273	9.7419	12.8013	0.6956
	B1C4	7.8787	9.0387	41.1316	2.4174
	B1C5	21.5016	11.2699	17.2937	2.5699
	B2C1	15.8226	1.5322	-2.8697	3.9973
	B2C2	11.1595	1.8752	-3.3681	4.3490
	B2C3	8.7743	0.9990	-2.4959	1.9125
	B2C4	9.4644	5.2681	-0.5101	1.6616
	B2C5	19.2427	3.8055	0.2638	11.0286
	B3C1	11.9293	1.3416	-3.9544	5.1855
	B3C2	12.4828	2.3810	-4.2844	3.5684
	B3C3	14.8788	1.9906	-2.8613	3.9352
	B3C4	10.6506	2.1489	-2.7230	2.9569
	B3C5	15.8515	2.6724	-4.6239	5.1980
	B4C1	8.8982	7.2921	13.2628	-1.4032
	B4C2	2.9869	9.1517	12.3645	-0.3088
	B4C3	9.2460	6.7357	11.1683	6.1995
	B4C4	16.7879	14.2495	20.4963	5.4065
	B4C5	0.3090	10.9370	15.3736	0.4635

Table 103 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
BD	B1D1	8.9036	7.7200	23.4188	2.5907
	B2D1	14.1989	3.2281	-1.9207	4.5129
	B3D1	14.4397	1.8131	-3.3807	4.2249
	B4D1	7.7842	10.3460	16.6914	2.3595
	B1D2	5.4098	9.1766	12.0322	1.2483
	B2D2	11.5865	2.1639	-1.6713	4.6667
	B3D2	11.8775	2.4007	-3.9981	4.1127
	B4D2	7.5070	9.0004	12.3748	1.7835
BS	B1S1	8.5557	9.4898	22.3283	2.5736
	B2S1	13.5287	2.9227	-1.3343	4.6689
	B3S1	13.7206	2.6342	-3.1008	4.5329
	B4S1	11.9198	9.6681	17.2136	2.2646
	B1S2	5.7577	7.4068	13.1227	1.2654
	B2S2	12.2567	2.4693	-2.2577	4.5107
	B3S2	12.5966	1.5796	-4.2780	3.8047
	B4S2	3.3714	9.6783	11.8526	1.8784
CD	C1D1	10.8317	3.4288	3.0353	2.4860
	C2D1	6.7597	5.0116	3.8455	2.3337
	C3D1	8.9862	4.7040	5.9520	5.1368
	C4D1	13.8223	8.6761	23.2621	3.2055
	C5D1	16.2581	7.0635	7.4162	3.9480
	C1D2	8.2211	4.1106	4.3008	2.6552
	C2D2	8.5151	5.3314	3.0943	2.1765
	C3D2	7.9770	5.0296	3.3542	1.2346
	C4D2	8.5685	6.6765	5.9353	3.0157
	C5D2	12.1943	7.2789	6.7374	5.6820
CS	C1S1	11.5357	4.4994	4.4388	2.7516
	C2S1	9.0508	4.2103	4.1600	2.2514
	C3S1	10.6665	5.2804	5.8625	2.0312
	C4S1	12.8897	7.8204	21.6112	4.5916
	C5S1	15.5133	9.0830	7.8110	5.9242
	C1S2	7.5171	3.0400	2.8972	2.3896
	C2S2	6.2240	6.1327	2.7798	2.2588
	C3S2	6.2967	4.4532	3.4437	4.3402
	C4S2	9.5011	7.5322	7.5862	1.6296
	C5S2	12.9391	5.2594	6.3426	3.7058

Table 103 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
DS	D1S1	13.7576	5.8034	11.1776	3.5078
	D2S1	11.5212	5.7120	7.2600	3.0386
	D1S2	8.9056	5.7502	6.2266	3.3362
	D2S2	6.6692	5.6588	2.2088	2.8670

Table 104

Results of Analyses of Covariance Among Positive Mean Goal Discrepancy Scores: Rote Learning Non-Verbal Task

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	307	437.77	78.22	516.10	72.21
Regression	39	1,204.30	318.05	966.90	159.45
Error	268	326.22	43.32	450.50	59.51
B	3	88.70	88.91	1,065.93	24.95
C	4	394.73	160.28**	1,284.00*	56.39
D	1	362.98	0.61	1,171.50	15.98
S	1	829.45	56.33	1,220.12	29.25
BC	12	540.52	37.89	543.24	120.11*
BD	3	32.66	31.81	520.87	7.98
BS	3	203.39	13.96	276.27	4.41
CD	4	111.19	17.71	868.17	61.86
CS	4	8.21	61.83	430.88	59.45
DS	1	142.00	50.20	43.55	15.88
MA	1	295.50	108.90	20.16	3.15
CA	1	3.04	471.97**	1,429.44	71.78
IQ	1	101.60	136.17	120.11	1.97

* P < .05

** P < .01

Table 105

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Positive Goal Discrepancy Scores: Rote Learning Non-Verbal Task

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$Z_{.05}^{S}$	$Z_{.01}^{S}$	Results
C	A2	C1:C2	11.1259	19.2186	25.0105	C1=C2
		C1:C3	8.4975	18.2313	23.9574	C1=C3
		C1:C4	30.5108	20.3375	26.1952	C1<C4**
		C1:C5	26.3479	19.8767	25.6686	C1<C5**
		C2:C3	2.3205	18.2313	53.9574	C2=C3
		C2:C4	19.4023	19.2186	25.0105	C2<C4*
		C2:C5	15.2298	18.2313	53.9574	C2=C5
		C3:C4	21.3967	19.8767	25.6686	C3<C4*
		C3:C5	17.3982	19.2186	25.0105	C3=C5
		C4:C5	3.8464	18.2313	53.9574	C4=C5
C	A3	C1:C2	1.5724	58.7794	77.2408	C1=C2
		C1:C3	7.6306	58.7794	77.2408	C1=C3
		C1:C4	85.3710	64.0844	82.7580	C1<C4**
		C1:C5	26.4046	61.9624	80.6360	C1=C5
		C2:C3	9.0110	61.9624	80.6360	C2=C3
		C2:C4	86.2037	65.5698	84.4556	C2<C4**
		C2:C5	27.4694	64.0844	82.7580	C2=C5
		C3:C4	75.7437	61.9624	80.6360	C3<C4*
		C3:C5	18.2985	58.7794	77.2408	C3=C5
		C4:C5	57.2853	58.7794	77.2408	C4=C5
BC	A4	B4C5:B4C1	1.6464	21.3567	28.0644	B4C5=B4C1
		B4C5:B2C4	1.9590	22.5132	29.2980	B4C5=B2C4
		B4C5:B2C3	2.9099	23.2842	30.0690	B4C5=B2C3
		B4C5:B4C2	7.7920	23.8239	30.6858	B4C5=B4C2
		B4C5:B1C3	10.2663	24.2865	31.1484	B4C5=B1C3
		B4C5:B3C4	10.7104	24.5940	31.5339	B4C5=B3C4
		B4C5:B1C5	9.5815	24.9033	31.9194	B4C5=B1C5
		B4C5:B3C5	10.8734	25.1346	32.1507	B4C5=B3C5
		B4C5:B3C3	15.3159	25.3659	32.3820	B4C5=B3C3
		B4C5:B2C1	16.9391	25.5587	32.6133	B4C5=B2C1
		B4C5:B3C2	18.1907	25.7514	32.8446	B4C5=B3C2
		B4C5:B1C2	18.3010	25.9056	33.0373	B4C5=B1C2
		B4C5:B1C4	19.0515	26.0598	33.2301	B4C5=B1C4
		B4C5:B2C2	20.0243	26.1755	33.3457	B4C5=B2C2
		B4C5:B1C1	22.6176	26.2911	33.4614	B4C5=B1C1
		B4C5:B3C1	25.3008	24.4067	33.6156	B4C5<B3C1*
		B4C5:B4C4	28.9754	26.5224	33.7698	B4C5<B4C4*
		B4C5:B4C3	30.3679	26.6381	33.8855	B4C5<B4C3*
		B4C5:B2C5	34.1394	26.7537	34.0011	B4C5<B2C5**
		B4C1:B2C4	0.0344	21.3567	28.0644	B4C1=B2C4

Table 105 (Continued)

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$Z_{.05}S$	$Z_{.01}S$	Results
BC	A4 (Continued)	B4C1:B2C3	0.9646	22.5132	29.2980	B4C1=B2C3
		B4C1:B4C2	6.4610	23.2842	30.0690	B4C1=B4C2
		B4C1:B1C3	8.4994	23.8239	30.6858	B4C1=B1C3
		B4C1:B3C4	9.1162	24.2865	31.1484	B4C1=B3C4
		B4C1:B1C5	9.9517	24.5940	31.5339	B4C1=B1C5
		B4C1:B3C5	11.9561	24.9033	31.9194	B4C1=B3C5
		B4C1:B3C3	13.8955	25.1346	32.1507	B4C1=B3C3
		B4C1:B2C1	12.8895	25.3659	32.3820	B4C1=B2C1
		B4C1:B3C2	16.5748	25.5587	32.6133	B4C1=B3C2
		B4C1:B1C2	17.0565	25.7514	32.8446	B4C1=B1C2
		B4C1:B1C4	17.8365	25.9056	33.0373	B4C1=B1C4
		B4C1:B2C2	18.7817	26.0598	33.2301	B4C1=B2C2
		B4C1:B1C1	17.6884	26.1755	33.3457	B4C1=B1C1
		B4C1:B3C1	20.0860	26.2911	33.4614	B4C1=B3C1
		B4C1:B4C4	28.7315	26.4067	33.6156	B4C1<B4C4*
		B4C1:B4C3	30.4582	26.5224	33.7698	B4C1<B4C3*
		B4C1:B2C5	40.5810	26.6381	33.8855	B4C1<B2C5**
		B2C4:B2C3	0.7862	21.3567	28.0644	B2C4=B2C3
		B2C4:B4C2	7.2923	22.5132	29.2980	B2C4=B4C2
		B2C4:B1C3	8.4656	23.2842	30.0690	B2C4=B1C3
		B2C4:B3C4	7.4812	23.8239	30.6858	B2C4=B3C4
		B2C4:B1C5	9.9173	24.2865	31.1484	B2C4=B1C5
		B2C4:B3C5	11.7070	24.5940	31.5339	B2C4=B3C5
		B2C4:B3C3	13.6114	24.9033	31.9194	B2C4=B3C3
		B2C4:B2C1	13.1782	25.1346	32.1507	B2C4=B2C1
		B2C4:B3C2	16.5411	25.3659	32.3820	B2C4=B3C2
		B2C4:B1C2	17.3350	25.5587	32.6133	B2C5=B1C2
		B2C4:B1C4	14.5356	25.7514	32.8446	B2C4=B1C4
		B2C4:B2C2	15.8442	25.9056	33.0373	B2C4=B2C2
		B2C4:B1C1	21.4385	26.0598	33.2301	B2C4=B1C1
		B2C4:B3C1	23.7318	26.1755	33.3457	B2C4=B3C1
		B2C4:B4C4	27.3007	26.2911	33.4614	B2C4<B4C4*
		B2C4:B4C3	35.5966	26.4067	33.6156	B2C4<B4C3**
		B2C4:B2C5	35.1146	26.5224	33.7698	B2C4<B2C5**
		B2C3:B4C2	6.4958	21.3567	28.0644	B2C3=B4C2
		B2C3:B1C3	6.1662	22.5132	29.2980	B2C3=B1C3
		B2C3:B3C4	8.1516	23.2842	30.0690	B2C3=B3C4
		B2C3:B1C5	8.9871	23.8239	30.6858	B2C3=B1C5
		B2C3:B3C5	10.7935	24.2865	31.1484	B2C3=B3C5
		B2C3:B3C3	10.9285	24.5940	31.5339	B2C3=B3C3
		B2C3:B2C1	12.3726	24.9033	31.9194	B2C3=B2C1
		B2C3:B3C2	15.6276	25.1346	32.1507	B2C3=B3C2
		B2C3:B1C2	16.1093	25.3659	32.3820	B2C3=B1C2
		B2C3:B1C4	16.8892	25.5587	32.6133	B2C3=B1C4
		B2C3:B2C2	15.4301	25.7514	32.8446	B2C3=B2C2
		B2C3:B1C1	20.5083	25.9056	33.0373	B2C3=B1C1
		B2C3:B3C1	22.8016	26.0598	33.2301	B2C3=B3C1

Table 105 (Continued)

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$Z_{.05}S$	$Z_{.01}S$	Results
BC (Continued)	A4	B2C3:B4C4	32.2115	26.1755	33.3457	B2C3<B4C4*
		B2C3:B4C3	28.8722	26.2911	33.4614	B2C3<B4C3*
		B2C3:B2C5	34.3090	26.4067	33.6156	B2C3<B2C5**
		B4C2:B1C3	1.1514	21.3567	28.0644	B4C2=B1C3
		B4C2:B3C4	1.6259	22.5132	29.2980	B4C2=B3C4
		B4C2:B1C5	2.4464	23.2842	30.0690	B4C2=B1C5
		B4C2:B3C5	4.4957	23.8239	30.6858	B4C2=B3C5
		B4C2:B3C3	6.4350	24.2865	31.1484	B4C2=B3C3
		B4C2:B2C1	7.4007	24.5940	31.5339	B4C2=B2C1
		B4C2:B3C2	7.7584	24.9033	31.9194	B4C2=B3C2
		B4C2:B1C2	8.1625	25.1346	32.1507	B4C2=B1C2
		B4C2:B1C4	10.3137	25.3659	32.3820	B4C2=B1C4
		B4C2:B2C2	9.3259	25.5587	32.6133	B4C2=B2C2
		B4C2:B1C1	14.0124	25.7514	32.8446	B4C2=B1C1
		B4C2:B3C1	16.3058	25.9056	33.0373	B4C2=B3C1
		B4C2:B4C4	21.7335	26.0598	33.2301	B4C2=B4C4
		B4C2:B4C3	24.3126	26.1755	33.3457	B4C2=B4C3
		B4C2:B2C5	33.1206	26.2911	33.4614	B4C2<B2C5*
		B1C3:B3C4	0.4441	21.3567	28.0644	B1C3=B3C4
		B1C3:B1C5	1.0679	22.5132	29.2980	B1C3=B1C5
		B1C3:B3C5	3.1190	23.2842	30.0690	B1C3=B3C5
		B1C3:B3C3	4.2014	23.8239	30.6858	B1C3=B3C3
		B1C3:B2C1	6.4771	24.2865	31.1484	B1C3=B2C1
		B1C3:B3C2	8.0754	24.5940	31.5339	B1C3=B3C2
		B1C3:B1C2	7.1782	24.9033	31.9194	B1C3=B1C2
		B1C3:B1C4	7.6235	25.1346	32.1507	B1C3=B1C4
		B1C3:B2C2	9.7580	25.3659	32.3820	B1C3=B2C2
		B1C3:B1C1	10.5586	25.5587	32.6133	B1C3=B1C1
		B1C3:B3C1	14.8388	25.7514	32.8446	B1C3=B3C1
		B1C3:B4C4	24.0792	25.9056	33.0373	B1C3=B4C4
		B1C3:B4C3	21.4076	26.0598	33.2301	B1C3=B4C3
		B1C3:B2C5	30.7643	26.1755	33.3457	B1C3<B2C5*
		B3C4:B1C5	0.8355	21.3567	28.0644	B3C4=B1C5
		B3C4:B3C5	2.4002	22.5132	29.2980	B3C4=B3C5
		B3C4:B3C3	4.0392	23.2842	30.0690	B3C4=B3C3
		B3C4:B2C1	6.1350	23.8239	30.6858	B3C4=B2C1
		B3C4:B3C2	6.5606	24.2865	31.1484	B3C4=B3C2
		B3C4:B1C2	8.2532	24.5940	31.5339	B3C4=B1C2
		B3C4:B1C4	7.2540	24.9033	31.9194	B3C4=B1C4
		B3C4:B2C2	9.6655	25.1346	32.1507	B3C4=B2C2
		B3C4:B1C1	12.3567	25.3659	32.3820	B3C4=B1C1
		B3C4:B3C1	12.6874	25.5587	32.6133	B3C4=B3C1
		B3C4:B4C4	19.8195	25.7514	32.8446	B3C4=B4C4
		B3C4:B4C3	26.8452	25.9056	33.0373	B3C4<B4C3*
		B3C4:B2C5	31.4648	26.0598	33.2301	B3C4<B2C5*

Table 105 (Continued)

Variable	Level of Practice	Comparison	$\frac{(b_i-b_j) \times}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$Z_{.05}^{S}$	$Z_{.01}^{S}$	Results
BC (Continued)	A4	B1C5:B3C5	1.6512	21.3567	28.0644	B1C5=B3C5
		B1C5:B3C3	3.8727	22.5132	29.2980	B1C5=B3C3
		B1C5:B2C1	5.2994	23.2842	30.0690	B1C5=B2C1
		B1C5:B3C2	6.9271	23.8239	30.6858	B1C5=B3C2
		B1C5:B1C2	6.2690	24.2865	31.1484	B1C5=B1C2
		B1C5:B1C4	6.7646	24.5940	31.5339	B1C5=B1C4
		B1C5:B2C2	8.8299	24.9033	31.9194	B1C5=B2C2
		B1C5:B1C1	9.9777	25.1346	32.1507	B1C5=B1C1
		B1C5:B3C1	13.8145	25.3659	32.3820	B1C5=B3C1
		B1C5:B4C4	23.2244	25.5587	32.6133	B1C5=B4C4
		B1C5:B4C3	26.0401	25.7514	32.8446	B1C5<B4C3*
		B1C5:B2C5	25.8863	25.9056	33.0373	B1C5=B2C5
		B3C5:B3C3	1.6390	21.3567	28.0644	B3C5=B3C3
		B3C5:B2C1	3.2950	22.5132	29.2980	B3C5=B2C1
		B3C5:B3C2	4.0551	23.2842	30.0690	B3C5=B3C2
		B3C5:B1C2	5.3157	23.8239	30.6858	B3C5=B1C2
		B3C5:B1C4	5.9816	24.2865	31.1484	B3C5=B1C4
		B3C5:B2C2	6.7026	24.5940	31.5339	B3C5=B2C2
		B3C5:B1C1	9.3454	24.9033	31.9194	B3C5=B1C1
		B3C5:B3C1	9.9813	25.1346	32.1507	B3C5=B3C1
		B3C5:B4C4	20.8378	25.3659	32.3820	B3C5=B4C4
		B3C5:B4C3	24.1086	25.5587	32.6133	B3C5=B4C3
		B3C5:B2C5	23.5799	25.7514	32.8446	B3C5=B2C5
		B3C3:B2C1	1.3557	21.3567	28.0644	B3C3=B2C1
		B3C3:B3C2	2.5214	22.5132	29.2980	B3C3=B3C2
		B3C3:B1C2	3.4113	23.2842	30.0690	B3C3=B1C2
		B3C3:B1C4	4.1913	23.8239	30.6858	B3C3=B1C4
		B3C3:B2C2	4.8862	24.2865	31.1484	B3C3=B2C2
		B3C3:B1C1	7.5774	24.5940	31.5339	B3C3=B1C1
		B3C3:B3C1	8.5484	24.9033	31.9194	B3C3=B3C1
		B3C3:B4C4	18.9334	25.1346	32.1507	B3C3=B4C4
		B3C3:B4C3	17.9833	25.3659	32.3820	B3C3=B4C3
		B3C3:B2C5	26.2050	25.5587	32.6133	B3C3<B2C5*
		B2C1:B3C2	1.6277	21.3567	28.0644	B2C1=B3C2
		B2C1:B1C2	2.1182	22.5132	29.2980	B2C1=B1C2
		B2C1:B1C4	2.8600	23.2842	30.0690	B2C1=B1C4
		B2C1:B2C2	3.0575	23.8239	30.6858	B2C1=B2C2
		B2C1:B1C1	5.2583	24.2865	31.1484	B2C1=B1C1
		B2C1:B3C1	7.1965	24.5940	31.5339	B2C1=B3C1
		B2C1:B4C4	17.9250	24.9033	31.9194	B2C1=B4C4
		B2C1:B4C3	20.9334	25.1346	32.1507	B2C1=B4C3
		B2C1:B2C5	21.9364	25.3659	32.3820	B2C1=B2C5
		B3C2:B1C2	0.3933	21.3567	28.0644	B3C2=B1C2
		B3C2:B1C4	1.2380	22.5132	29.2980	B3C2=B1C4
		B3C2:B2C2	1.5675	23.2842	30.0690	B3C2=B2C2
		B3C2:B1C1	4.5113	23.8239	30.6858	B3C2=B1C1
		B3C2:B3C1	5.9647	24.2865	31.1484	B3C2=B3C1
		B3C2:B4C4	16.0038	24.5940	31.5339	B3C2=B4C4

Table 105 (Continued)

Variable	Level of Practice	Comparison	(b_i-b_j) x $\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$Z_{.05}S$	$Z_{.01}S$	Results
BC (Continued)	A4	B3C2:B4C3	18.9890	24.9033	31.9194	B3C2=B4C3
		B3C2:B2C5	23.7022	25.1346	32.1507	B3C2=B2C5
		B1C2:B1C4	0.6543	21.3567	28.0644	B1C2=B1C4
		B1C2:B2C2	1.1634	22.5132	29.2980	B1C2=B2C2
		B1C2:B1C1	3.4681	23.2842	30.0690	B1C2=B1C1
		B1C2:B3C1	6.3969	23.8239	30.6858	B1C2=B3C1
		B1C2:B4C4	15.5221	24.2865	31.1484	B1C2=B4C4
		B1C2:B4C3	18.8923	24.5940	31.5339	B1C2=B4C3
		B1C2:B2C5	22.7937	24.9033	31.9194	B1C2=B2C5
		B1C4:B2C2	0.6069	21.3567	28.0644	B1C4=B2C2
		B1C4:B1C1	2.7969	22.5132	29.2980	B1C4=B1C1
		B1C4:B3C1	5.5017	23.2842	30.0690	B1C4=B3C1
		B1C4:B4C4	12.0367	23.8239	30.6858	B1C4=B4C4
		B1C4:B4C3	17.7750	24.2865	31.1484	B1C4=B4C3
		B1C4:B2C5	22.0137	24.5940	31.5339	B1C4=B2C5
		B2C2:B1C1	2.6913	21.3567	28.0644	B2C2=B1C1
		B2C2:B3C1	4.9846	22.5132	29.2980	B2C2=B3C1
		B2C2:B4C4	14.1352	23.2842	30.0690	B2C2=B4C4
		B2C2:B4C3	17.5314	23.8239	30.6858	B2C2=B4C3
		B2C2:B2C5	18.8789	24.2865	31.1484	B2C2=B2C5
		B1C1:B3C1	1.9382	21.3567	28.0644	B1C1=B3C1
		B1C1:B4C4	11.7032	22.5132	29.2980	B1C1=B4C4
		B1C1:B4C3	14.9380	23.2842	30.0690	B1C1=B4C3
		B1C1:B2C5	19.1081	23.8239	30.6858	B1C1=B2C5
		B3C1:B4C4	9.4099	21.3567	28.0644	B3C1=B4C4
		B3C1:B4C3	12.7281	22.5132	29.2980	B3C1=B4C3
		B3C1:B2C5	16.8148	23.2842	30.0690	B3C1=B2C5
		B4C4:B4C3	3.0458	21.3567	28.0644	B4C4=B4C3
		B4C4:B2C5	7.4065	22.5132	29.2980	B4C4=B2C5
		B4C3:B2C5	3.4750	21.3567	28.0644	B4C3=B2C5

* $P < .05$
** $P < .01$

Table 106

Mean Negative Goal Discrepancy Scores: Rote Learning Non-Verbal Task

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	+0.4057	-6.3492	-3.2820	-0.8681
	B2	-1.0683	-3.4954	-6.7207	-6.5038
	B3	-3.2129	-3.4944	-8.1700	-8.0034
	B4	+0.4347	-2.5926	-0.4457	+1.6357
C	C1	-0.2868	-1.7351	-1.8422	-1.0559
	C2	-0.2046	-2.9085	-2.2677	-2.5728
	C3	-1.2427	-3.6609	-6.1243	-3.7704
	C4	-1.9599	-5.7010	-9.8644	-5.3593
	C5	-0.6070	-5.9090	-3.1744	-4.4161
D	D1	-0.7968	-4.4510	-4.7773	-4.1004
	D2	-0.9236	-3.5148	-4.5319	-2.7694
S	S1	-0.7156	-3.5917	-3.5512	-2.6791
	S2	-1.0048	-4.3741	-5.7580	-4.1907
BC	B1C1	+0.4060	-1.8075	+1.1427	+1.7385
	B1C2	+1.1411	-4.4317	+0.4626	+1.0386
	B1C3	-1.5353	-7.5438	-6.6791	-1.4699
	B1C4	+1.0072	-8.0915	-9.8969	-0.7454
	B1C5	+1.0095	-9.8715	-1.4423	-4.9023
	B2C1	-0.4636	-0.5831	-2.3524	-2.5425
	B2C2	-0.2933	-2.1288	-3.0772	-6.6175
	B2C3	-1.3042	-2.4235	-9.6731	-5.7421
	B2C4	-2.3831	-6.4901	-14.5276	-12.7211
	B2C5	-0.8973	-5.8515	-3.9732	-4.8958
	B3C1	-2.0723	-2.1376	-5.9945	-5.6339
	B3C2	-2.8049	-4.2208	-7.9639	-8.0397
	B3C3	-2.4017	-3.5747	-8.2368	-8.6691
	B3C4	-5.8869	-3.8488	-12.0528	-9.0723
	B3C5	-2.8987	-3.6901	-6.6020	-8.6020
	B4C1	+0.9827	-2.4122	-0.1676	+2.2143
	B4C2	+1.1387	-0.8527	+1.5077	+3.3274
	B4C3	+0.2704	-1.1016	+0.0918	+2.8199
	B4C4	-0.5768	-4.3736	-2.9803	+3.1220
	B4C5	+0.3585	-4.2229	-0.6801	+2.7561

Table 106 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
BD	B1D1	+0.5534	-7.2153	-3.6426	-2.4210
	B2D1	-1.1673	-4.1926	-6.0661	-7.6540
	B3D1	-2.7320	-3.6251	-8.7677	-7.9994
	B4D1	+0.1587	-2.7710	-0.6328	+1.6728
	B1D2	+0.2580	-5.4831	-2.9214	+ 0.6848
	B2D2	-0.9693	-2.7982	-7.3753	-5.3536
	B3D2	-3.6938	-3.3637	-7.5723	-8.0074
	B4D2	+0.7107	-2.4142	-0.2586	+ 1.5986
BS	B1S1	+0.2698	-5.3919	-2.7069	+0.7154
	B2S1	-0.7980	-3.5657	-3.9883	-4.9186
	B3S1	-2.7473	-2.9004	-7.5429	-7.7492
	B4S1	+0.4131	-2.5088	0.0333	+1.2360
	B1S2	+0.5416	-7.3065	-3.8571	-2.4516
	B2S2	-1.3386	-3.4251	-9.4531	-8.0890
	B3S2	-3.6785	-4.0884	-8.7971	-8.2576
	B4S2	+0.4563	-2.6764	-0.9247	+2.0354
CD	C1D1	-0.5266	-1.6340	-1.9130	-1.2260
	C2D1	-0.1571	-2.6723	-2.9879	-3.0245
	C3D1	-1.0484	-2.2751	-2.7755	-2.9721
	C4D1	-1.6998	-8.3565	-13.1929	-7.2590
	C5D1	-0.5521	-7.3171	-3.0172	-6.0204
	C1D2	-0.0470	-1.8362	-1.7714	-0.8858
	C2D2	-0.2521	-3.1447	-1.5475	-2.1211
	C3D2	-1.4370	-5.0467	-9.4731	-4.5687
	C4D2	-2.2200	-3.0455	-6.5359	-3.4596
	C5D2	-0.6619	-4.5009	-3.3316	-2.8118
CS	C1S1	-0.4263	-1.6323	-1.8302	-1.0384
	C2S1	-0.4464	-4.0642	-2.9530	-2.5961
	C3S1	-1.7956	-2.0684	-2.7977	-3.3668
	C4S1	-0.5255	-4.8743	-6.9229	-3.6111
	C5S1	-0.3842	-5.3193	-3.2522	-2.7831
	C1S2	-0.1473	-1.8379	-1.8542	-1.0734
	C2S2	0.0372	-1.7528	-1.5824	-2.5495
	C3S2	-0.6898	-5.2534	-9.4509	-4.1740
	C4S2	-3.3943	-6.5277	-12.8059	-7.1075
	C5S2	-0.8298	-6.4987	-3.0966	-6.0491

Table 106 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
DS	D1S1	-0.7011	-4.3422	-4.2953	-2.5634
	D2S1	-0.8279	-3.4060	-4.0499	-1.2324
	D1S2	-0.8925	-4.5598	-5.2593	-5.6374
	D2S2	-1.0193	-3.6236	-5.0139	-4.3064

Table 107

Results of Analyses of Covariance Among Mean Negative Goal Discrepancy Scores: Rote Learning Non-Verbal Task

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	307	13.30	74.33	106.10	76.09
Regression	39	19.17	198.35	326.03	172.81
Error	268	12.45	56.28	74.03	62.02
B	3	15.57	172.07*	96.09	117.23
C	4	32.73*	193.12*	678.12***	169.21*
D	1	1.17	63.61	4.37	128.55
S	1	5.88	43.03	342.27*	160.56
BC	12	12.47	36.31	67.60	67.48
BD	3	7.79	9.95	22.04	47.55
BS	3	5.39	15.67	84.79	67.57
CD	4	2.25	145.85*	334.53**	70.58
CS	4	33.54*	58.45	197.33*	43.73
DS	1	0.68	22.58	109.34	172.79
MA	1	8.14	17.70	40.81	127.72
CA	1	7.65	23.19	45.05	107.21
IQ	1	29.75	10.19	153.74	0.01

* $P < .05$
** $P < .01$
*** $P < .001$

Table 108

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Negative Goal Discrepancy Scores: Rote Learning Non-Verbal Task

Vari- able	Level of Practice	Compari- son	$\frac{(b_i-b_j)\ x}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$z_{.05}S$	$z_{.01}S$	Results
B	A2	B1:B2	9.8858	20.7750	27.3000	B1=B2
		B1:B3	6.3836	21.9000	28.5000	B1=B3
		B1:B4	29.3398	22.6500	29.2500	B1<B4**
		B2:B3	0.0045	20.7750	27.3000	B2=B3
		B2:B4	2.7084	21.9000	28.5000	B2=B4
		B3:B4	1.8036	20.7750	27.3000	B3=B4
C	A1	C1:C2	0.6524	9.7781	12.8492	C1=C2
		C1:C3	7.4044	10.3076	13.4140	C1=C3
		C1:C4	12.9891	10.6606	13.7670	C1>C4*
		C1:C5	2.4803	9.7781	12.8492	C1=C5
		C2:C3	7.9060	10.6606	13.7670	C2=C3
		C2:C4	13.5191	10.9077	14.0494	C2>C4*
		C2:C5	3.0646	10.3076	13.4140	C2=C5
		C3:C4	5.3859	9.7781	12.8492	C3=C4
		C3:C5	4.7994	9.7781	12.8492	C3=C5
		C4:C5	10.2273	10.3076	13.4140	C4=C5
C	A2	C1:C2	9.3136	20.7750	27.3000	C1=C2
		C1:C3	14.9172	21.9000	28.5000	C1=C3
		C1:C4	30.9745	22.6500	29.2500	C1>C4**
		C1:C5	32.3310	23.1750	29.8500	C1>C5**
		C2:C3	5.7301	20.7750	27.3000	C2=C3
		C2:C4	21.6307	21.9000	28.5000	C2=C4
		C2:C5	22.8512	22.6500	29.2500	C2>C5*
		C3:C4	15.5370	20.7750	27.3000	C3=C4
		C3:C5	16.9727	21.9000	28.5000	C3=C5
		C4:C5	1.5841	20.7750	27.3000	C4=C5
C	A3	C1:C2	3.3770	23.8334	31.3189	C1=C2
		C1:C3	33.1692	25.9844	33.5560	C1>C3*

Table 108 (Continued)

Variable	Level of Practice	Comparison	$\frac{(b_i - b_j) \times}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$Z_{.05}S$	$Z_{.01}S$	Results
C (Continued)	A3	C1:C4	62.6547	26.5867	34.2443	C1>C4**
		C1:C5	10.3182	25.1240	32.6956	C1=C5
		C2:C3	29.3715	25.1240	32.6956	C2>C3*
		C2:C4	58.8440	25.9844	33.5570	C2>C4**
		C2:C5	6.9046	23.8334	31.3189	C2=C5
		C3:C4	28.4835	23.8334	31.3189	C3>C4*
		C3:C5	22.2722	23.8334	31.3189	C3=C5
		C4:C5	50.9504	25.1240	32.6956	C4<C5**
C	A4	C1:C2	12.0401	21.8276	28.6832	C1=C2
		C1:C3	21.0265	23.0096	29.9440	C1=C3
		C1:C4	33.6104	24.3492	31.3624	C1>C4**
		C1:C5	26.0281	23.7976	30.7320	C1>C5*
		C2:C3	9.1207	21.8276	28.6832	C2=C3
		C2:C4	21.5842	23.7976	30.7320	C2=C4
		C2:C5	14.0382	23.0096	29.9440	C2=C5
		C3:C4	12.1007	23.0096	29.9440	C3=C4
		C3:C5	4.8749	21.8276	28.6832	C3=C5
		C4:C5	7.1832	21.8276	28.6832	C4=C5
S	A3	S1:S2	26.0177	23.8334	31.3189	S1>S2*
CD	A2	C4D1:C3D2	3.3183	20.7750	27.3000	C4D1=C3D2
		C4D1:C5D1	9.6624	21.9000	28.5000	C4D1=C5D1
		C4D1:C2D2	14.9050	22.6500	29.2500	C4D1=C2D2
		C4D1:C1D2	16.1009	23.1750	29.8500	C4D1=C1D2
		C4D1:C1D1	21.5296	23.6250	30.3000	C4D1=C1D1
		C4D1:C2D1	22.3991	23.9250	30.6750	C4D1=C2D1
		C4D1:C5D2	31.1173	24.2250	31.0500	C4D1<C5D2**

Table 108 (Continued)

Variable	Level of Practice	Comparison	$(b_i-b_j) x \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$z_{.05}S$	$z_{.01}S$	Results
CD	A2 (Continued)	C4D1:C3D1	30.7777	24.4500	31.2750	C4D1<C3D1*
		C4D1:C4D2	26.9680	24.6750	31.5000	C4D1<C4D2*
		C3D2:C5D1	9.0932	20.7750	27.3000	C3D2=C5D1
		C3D2:C2D2	8.8302	21.9000	28.5000	C3D2=C2D2
		C3D2:C1D2	9.8679	22.6500	29.2500	C3D2=C1D2
		C3D2:C1D1	24.1096	23.1750	29.8500	C3D2<C1D1*
		C3D2:C2D1	25.3249	23.6250	30.3000	C3D2<C2D1*
		C3D2:C5D2	21.2778	23.9250	30.6750	C3D2=C5D2
		C3D2:C3D1	22.2468	24.2250	31.2750	C3D2=C3D1
		C3D2:C4D2	30.7777	24.4500	31.5000	C3D2<C4D2*
		C5D1:C2D2	2.3452	20.7750	27.3000	C5D1=C2D2
		C5D1:C1D2	3.7080	21.9000	28.5000	C5D1=C1D2
		C5D1:C1D1	11.6903	22.6500	29.2500	C5D1=C1D1
		C5D1:C2D1	12.7367	23.1750	29.8500	C5D1=C2D1
		C5D1:C5D2	11.4357	23.6250	30.3000	C5D1=C5D2
		C5D1:C3D1	21.2778	23.9250	30.6750	C5D1=C3D1
		C5D1:C4D2	31.1173	24.2250	31.0500	C5D1<C4D2**
		C2D2:C1D2	1.0465	20.7750	27.3000	C2D2=C1D2
		C2D2:C1D1	12.7985	21.9000	28.5000	C2D2=C1D1
		C2D2:C2D1	8.5682	22.6500	29.2500	C2D2=C2D1
		C2D2:C5D2	12.7367	23.1750	29.8500	C2D2=C5D2
		C2D2:C3D1	27.6582	23.6250	30.3000	C2D2<C3D1*
		C2D2:C4D2	22.3991	23.9250	30.6750	C2D2=C4D2
		C1D2:C1D1	7.0176	20.7750	27.3000	C1D2=C1D1
		C1D2:C2D1	12.7985	21.9000	28.5000	C1D2=C2D1
		C1D2:C5D2	11.6903	22.6500	29.2500	C1D2=C5D2
		C1D2:C3D1	24.1096	23.1750	29.8500	C1D2<C3D1*
		C1D2:C4D2	21.5296	23.6250	30.3000	C1D2=C4D2
		C1D1:C2D1	1.0465	20.7750	27.3000	C1D1=C2D1
		C1D1:C5D2	3.7080	21.9000	28.5000	C1D1=C5D2
		C1D1:C3D1	9.8679	22.6500	29.2500	C1D1=C3D1
		C1D1:C4D2	16.1009	23.1750	29.8500	C1D1=C4D2
		C2D1:C5D2	2.3452	20.7750	27.3000	C2D1=C5D2
		C2D1:C3D1	8.8302	21.9000	28.5000	C2D1=C3D1
		C2D1:C4D2	14.9050	22.6500	29.2500	C2D1=C4D2
		C5D2:C3D1	9.0932	20.7750	27.3000	C5D2=C3D1
		C5D2:C4D2	9.6624	21.9000	28.5000	C5D2=C4D2
		C3D1:C4D2	3.3183	20.7750	27.3000	C3D1=C4D2
CD	A3	C3D2:C4D1	2.6437	23.8334	31.3189	C3D2=C4D1
		C3D2:C2D1	28.4516	25.1240	32.6956	C3D2<C2D1*
		C3D2:C5D2	24.3073	25.9844	33.5560	C3D2=C5D2
		C3D2:C1D2	26.2661	26.5867	34.2443	C3D2=C1D2
		C3D2:C1D1	35.0582	27.1029	34.7606	C3D2<C1D1**
		C3D2:C5D1	37.3256	27.4471	35.1908	C3D2<C5D1**

Table 108 (Continued)

Variable	Level of Practice	Comparison	$\frac{(b_i-b_j)\ x}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$Z_{.05}S$	$Z_{.01}S$	Results
CD (Continued)	A3	C3D2:C2D2	31.2544	27.7912	35.6210	C3D2<C2D2*
		C3D2:C4D2	50.8533	28.0494	35.8791	C3D2<C4D2**
		C3D2:C3D1	41.6582	28.3015	36.1372	C3D2<C3D1**
		C4D1:C2D1	20.2042	23.8334	31.3189	C4D1=C2D1
		C4D1:C5D2	29.1133	25.1240	32.6956	C4D1<C5D2*
		C4D1:C1D2	31.3807	25.9844	33.5560	C4D1<C1D2*
		C4D1:C1D1	25.4438	26.5867	34.2443	C4D1=C1D1
		C4D1:C5D1	26.9998	27.1029	34.7606	C4D1=C5D1
		C4D1:C2D2	38.2228	27.4471	35.1908	C4D1<C2D2**
		C4D1:C4D2	39.5239	27.7912	35.6210	C4D1<C4D2**
		C4D1:C3D1	50.8533	28.0494	35.8791	C4D1<C3D1**
		C2D1:C5D2	3.1606	23.8334	31.3189	C2D1=C5D2
		C2D1:C1D2	5.4825	25.1240	32.6956	C2D1=C1D2
		C2D1:C1D1	5.0305	25.9844	33.5560	C2D1=C5D1
		C2D1:C5D1	6.7956	26.5867	34.2443	C2D1=C5D1
		C2D1:C2D2	7.2687	27.1029	34.7606	C2D1=C2D2
		C2D1:C4D2	38.2228	27.4471	35.1908	C2D1<C4D2**
		C2D1:C3D1	31.2544	27.7912	35.6210	C2D1<C3D1*
		C5D2:C1D2	1.7652	23.8334	31.3189	C5D2=C1D2
		C5D2:C1D1	2.5700	25.1240	32.6956	C5D2=C1D1
		C5D2:C5D1	3.4043	25.9844	33.5560	C5D2=C5D1
		C5D2:C2D2	6.7956	26.5867	34.2443	C5D2=C2D2
		C5D2:C4D2	26.9998	27.1029	34.7606	C5D2=C4D2
		C5D2:C3D1	37.3256	27.4471	35.1908	C5D2<C3D1**
		C1D2:C1D1	0.6405	23.8334	31.3189	C1D2=C1D1
		C1D2:C5D1	3.3178	25.1240	32.6956	C1D2=C5D1
		C1D2:C2D2	5.0305	25.9844	33.5560	C1D2=C2D2
		C1D2:C4D2	25.4438	26.5867	34.2443	C1D2=C4D2
		C1D2:C3D1	35.0582	27.1029	34.7606	C1D2<C3D1**
		C1D1:C5D1	1.7652	23.8334	31.3189	C1D1=C5D1
		C1D1:C2D2	5.4825	25.1240	32.6956	C1D1=C2D2
		C1D1:C4D2	31.3807	25.9844	33.5560	C1D1<C4D2*
		C1D1:C3D1	26.2661	26.5867	34.2443	C1D1=C3D1
		C5D1:C2D2	3.1606	23.8334	31.3189	C5D1=C2D2
		C5D1:C4D2	29.1133	25.1240	32.6956	C5D1<C4D2*
		C5D1:C3D1	24.3073	25.9844	33.5560	C5D1=C3D1
		C2D2:C4D2	20.2042	23.8334	31.3189	C2D2=C4D2
		C2D2:C3D1	28.4516	25.1240	32.6956	C2D2<C3D1*
		C4D2:C3D1	2.6437	23.8334	31.3189	C4D2=C3D1
CS	A1	C4S2:C3S1	5.7120	9.7781	12.8492	C4S2=C3S1
		C4S2:C2S1	8.8515	10.3076	13.4140	C4S2=C2S1
		C4S2:C1S1	9.8024	10.6606	13.7670	C4S2=C1S1

Table 108 (Continued)

Vari-able	Level of Practice	Compari-son	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$z_{.05}S$	$z_{.01}S$	Results
CS	A1 (Continued)	C4S2:C5S2	9.0668	10.9077	14.0494	C4S2=C5S2
		C4S2:C5S1	13.2633	11.1195	14.2612	C4S2<C5S1*
		C4S2:C1S2	12.0893	11.2607	14.4377	C4S2<C1S2*
		C4S2:C2S2	12.5435	11.4019	14.6142	C4S2<C2S2*
		C4S2:C3S2	14.8716	11.5078	14.7201	C4S2<C3S2**
		C4S2:C4S1	15.2612	11.6137	14.8260	C4S2<C4S1**
		C3S1:C2S1	2.3281	9.7781	12.8492	C3S1=C2S1
		C3S1:C1S1	3.1484	10.3076	13.4140	C3S1=C1S1
		C3S1:C5S2	6.0362	10.6606	13.7670	C3S1=C5S2
		C3S1:C5S1	5.7002	10.9077	14.0494	C3S1=C5S1
		C3S1:C1S2	9.5675	11.1195	14.2612	C3S1=C1S2
		C3S1:C2S2	10.5088	11.2607	14.4377	C3S1=C2S2
		C3S1:C3S2	8.1342	11.4019	14.6142	C3S1=C3S2
		C3S1:C4S1	14.8716	11.5078	14.7201	C3S1<C4S1**
		C2S1:C1S1	0.7858	9.7781	12.8492	C2S1=C1S1
		C2S1:C5S2	2.9722	10.3076	13.4140	C2S1=C5S2
		C2S1:C5S1	3.5076	10.6606	13.7670	C2S1=C5S1
		C2S1:C1S2	6.6037	10.9077	14.0494	C2S1=C1S2
		C2S1:C2S2	4.6368	11.1195	14.2612	C2S1=C2S2
		C2S1:C3S2	10.5088	11.2607	14.4377	C2S1=C3S2
		C2S1:C4S1	12.5435	11.4019	14.6142	C2S1<C4S1*
		C1S1:C5S2	2.0174	9.7781	12.8492	C1S1=C5S2
		C1S1:C5S1	2.7592	10.3076	13.4140	C1S1=C5S1
		C1S1:C1S2	3.5026	10.6606	13.7670	C1S1=C1S2
		C1S1:C2S2	6.6037	10.9077	14.0494	C1S1=C2S2
		C1S1:C3S2	9.5675	11.1195	14.2612	C1S1=C3S2
		C1S1:C4S1	12.0893	11.2607	14.4377	C1S1<C4S1*
		C5S2:C5S1	0.9253	9.7781	12.8492	C5S2=C5S1
		C5S2:C1S2	2.7592	10.3076	13.4140	C5S2=C1S2
		C5S2:C2S2	3.5076	10.6606	13.7670	C5S2=C2S2
		C5S2:C3S2	5.7002	10.9077	14.0494	C5S2=C3S2
		C5S2:C4S1	13.2633	11.1195	14.2612	C5S2<C4S1*
		C5S1:C1S2	2.0174	9.7781	12.8492	C5S1=C1S2
		C5S1:C2S2	2.9722	10.3076	13.4140	C5S1=C2S2
		C5S1:C3S2	6.0362	10.6606	13.7670	C5S1=C3S2
		C5S1:C4S1	9.0668	10.9077	14.0494	C5S1=C4S1
		C1S2:C2S2	0.7858	9.7781	12.8492	C1S2=C2S2
		C1S2:C3S2	3.1484	10.3076	13.4140	C1S2=C3S2
		C1S2:C4S1	9.8024	10.6606	13.7670	C1S2=C4S1
		C2S2:C3S2	2.3281	9.7781	12.8492	C2S2=C3S2
		C2S2:C4S1	8.8515	10.3076	13.4140	C2S2=C4S1
		C3S2:C4S1	5.7120	9.7781	12.8492	C3S2=C4S1

Table 108 (Continued)

Variable	Level of Practice	Comparison	$\frac{(b_i-b_j)\times}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$Z_{.05}S$	$Z_{.01}S$	Results
CS	A3 (Continued)	C3S2:C4S2	2.8818	23.8334	31.3189	C3S2=C4S2
		C3S2:C2S1	4.2127	25.1240	32.6956	C3S2=C2S1
		C3S2:C5S1	10.1562	25.9844	33.5560	C3S2=C5S1
		C3S2:C1S1	11.0314	26.5867	34.2443	C3S2=C1S1
		C3S2:C1S2	25.2433	27.1029	34.7606	C3S2=C1S2
		C3S2:C5S2	25.0172	27.4471	35.1908	C3S2=C5S2
		C3S2:C2S2	30.0223	27.7912	35.6210	C3S2<C2S2*
		C3S2:C4S1	39.1660	28.0494	35.8791	C3S2<C4S1**
		C3S2:C3S1	25.9270	28.3075	36.1372	C3S2=C3S1
		C4S2:C2S1	0.4840	23.8334	31.3189	C4S2=C2S1
		C4S2:C5S1	6.3689	25.1240	32.6956	C4S2=C5S1
		C4S2:C1S1	7.2779	25.9844	33.5560	C4S2=C1S1
		C4S2:C1S2	22.5018	26.5867	34.2443	C4S2=C1S2
		C4S2:C5S2	22.5943	27.1029	34.7606	C4S2=C5S2
		C4S2:C2S2	27.1404	27.4471	35.1908	C4S2=C2S2
		C4S2:C4S1	21.7488	27.7912	35.6210	C4S2=C4S1
		C4S2:C3S1	39.1660	28.0494	35.8791	C4S2<C3S1**
		C2S1:C5S1	4.5865	23.8334	31.3189	C2S1=C5S1
		C2S1:C1S1	5.3560	25.1240	32.6956	C2S1=C1S1
		C2S1:C1S2	28.3658	25.9844	33.5560	C2S1<C1S2*
		C2S1:C5S2	28.6408	26.5867	34.2443	C2S1<C5S2*
		C2S1:C2S2	21.4644	27.1029	34.7606	C2S1=C2S2
		C2S1:C4S1	27.1404	27.4471	35.1908	C2S1=C4S1
		C2S1:C3S1	30.0223	27.7912	35.6210	C2S1<C3S1*
		C5S1:C1S1	0.6839	23.8334	31.3189	C5S1=C1S1
		C5S1:C1S2	22.2669	25.1240	32.6956	C5S1=C1S2
		C5S1:C5S2	13.9762	25.9844	33.5560	C5S1=C5S2
		C5S1:C2S2	28.6408	26.5867	34.2443	C5S1<C2S2*
		C5S1:C4S1	22.5943	27.1029	34.7606	C5S1=C4S1
		C5S1:C3S1	25.0172	27.4471	35.1908	C5S1=C3S1
		C1S1:C1S2	13.4557	23.8334	31.3189	C1S1=C1S2
		C1S1:C5S2	22.2669	25.1240	32.6956	C1S1=C5S2
		C1S1:C2S2	28.3658	25.9844	33.5560	C1S1<C2S2*
		C1S1:C4S1	22.5018	26.5867	34.2443	C1S1=C4S1
		C1S1:C3S1	25.2433	27.1029	34.7606	C1S1=C3S1
		C1S2:C5S2	0.6839	23.8334	31.3189	C1S2=C5S2
		C1S2:C2S2	5.3560	25.1240	32.6956	C1S2=C2S2
		C1S2:C4S1	7.2779	25.9844	33.5560	C1S2=C4S1
		C1S2:C3S1	11.0314	26.5867	34.2443	C1S2=C3S1
		C5S2:C2S2	4.5865	23.8334	31.3189	C5S2=C2S2
		C5S2:C4S1	6.3689	25.1240	32.6956	C5S2=C4S1
		C5S2:C3S1	10.1562	25.9844	33.5560	C5S2=C3S1
		C2S2:C4S1	0.4840	23.8334	31.3189	C2S2=C4S1
		C2S2:C3S1	4.2127	25.1240	32.6956	C2S2=C3S1
		C4S1:C3S1	2.8818	23.8334	31.3189	C4S1=C3S1

* $P < .05$
** $P < .01$

TABLE 109

COMPARISON OF THE GROUPS IN TERMS OF DIRECTIONS OF GOAL CHANGE AFTER SUCCESS AND FAILURE: ROTE LEARNING NON-VERBAL TASK (FREQUENCIES)

Comparison	Trial 3				Trial 4				Trial 11				Trial 12			
	Direction				Direction				Direction				Direction			
	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T
B1D1C1	8	0	0	8	8	0	0	8	7	1	0	8	8	0	0	8
B1D1C2	8	0	0	8	8	0	0	8	5	0	3	8	6	0	2	8
B1D1C5	1	0	2	3	2	1	1	4	4	0	0	4	2	1	1	4
B1D2C1	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B1D2C2	7	1	0	8	8	0	0	8	7	0	1	8	7	0	1	8
B1D2C5	3	0	1	4	3	0	0	3	2	1	0	3	1	0	1	2
B2D1C1	7	0	1	8	8	0	0	8	8	0	0	8	8	0	0	8
B2D1C2	6	1	1	8	8	0	0	8	7	0	1	8	6	1	1	8
B2D1C5	5	0	0	5	4	1	0	5	2	1	0	3	1	2	0	3
B2D2C1	7	0	1	8	8	0	0	8	6	0	2	8	8	0	0	8
B2D2C2	7	0	1	8	7	1	0	8	5	2	1	8	6	1	1	8
B2D2C5	4	0	0	4	5	0	1	6	4	0	0	4	3	0	0	3
B3D1C1	7	0	1	8	7	0	1	8	6	0	2	8	6	0	2	8
B3D1C2	5	1	2	8	6	1	1	8	3	4	1	8	6	2	0	8
B3D1C5	4	0	0	4	4	0	0	4	1	0	0	1	4	0	0	4
B3D2C1	8	0	0	8	8	0	0	8	7	1	0	8	7	1	0	8
B3D2C2	8	0	0	8	7	1	0	8	6	1	1	8	7	1	0	8
B3D2C5	5	0	0	5	3	0	0	3	4	0	0	4	4	0	0	4
B4D1C1	7	1	0	8	8	0	0	8	8	0	0	8	7	1	0	8
B4D1C2	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B4D1C5	6	0	1	7	3	0	0	3	2	1	0	3	4	1	0	5
B4D[illegible]	7	1	0	8	7	0	1	8	8	0	0	8	8	0	0	8
B4[illegible]	8	0	0	8	8	0	0	8	8	0	0	8	7	0	1	8
B4D2C5	5	1	1	7	3	1	0	4	3	2	1	6	2	2	0	4

Comparison	Trial 3				Trial 4				Trial 11				Trial 12			
	Direction				Direction				Direction				Direction			
	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T
B1D1C3	0	6	2	8	2	5	1	8	3	4	1	8	1	6	1	8
B1D1C4	1	6	1	8	1	7	0	8	3	4	1	8	0	8	0	8
B1D1C5	1	3	0	4	1	3	0	4	0	2	2	4	0	3	1	4
B1D2C3	1	6	1	8	0	6	2	8	0	6	2	8	1	6	1	8
B1D2C4	1	6	1	8	1	6	1	8	2	5	1	8	1	7	0	8
B1D2C5	0	3	1	4	1	4	0	5	1	3	1	5	1	4	1	6
B2D1C3	0	7	1	8	2	5	1	8	0	7	1	8	3	4	1	8
B2D1C4	0	6	2	8	0	8	0	8	1	7	0	8	1	7	0	8
B2D1C5	0	2	1	3	0	2	1	3	2	2	1	5	0	4	1	5
B2D2C3	2	6	0	8	0	7	1	8	2	6	0	8	0	8	0	8
B2D2C4	0	7	1	8	2	6	0	8	1	6	1	8	0	7	1	8
B2D2C5	0	4	0	4	1	1	0	2	0	4	0	4	2	3	0	5

TABLE 109. (Continued)

Comparison	Trial 3				Trial 4				Trial 11				Trial 12			
	Direction				Direction				Direction				Direction			
	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T
B3D1C3	0	7	1	8	1	7	0	8	0	7	1	8	1	5	2	8
B3D1C4	2	4	2	8	1	6	1	8	1	7	0	8	1	6	1	8
B3D1C5	0	4	0	4	2	2	0	4	0	6	1	7	0	4	0	4
B3D2C3	0	5	3	8	0	7	1	8	1	5	2	8	0	6	2	8
B3D2C4	0	8	0	8	0	8	0	8	0	8	0	8	0	8	0	8
B3D2C5	1	0	1	2	0	5	0	5	0	3	1	4	1	3	0	4
B4D1C3	2	6	0	8	1	7	0	8	0	7	1	8	3	4	1	8
B4D1C4	3	3	2	8	1	5	2	8	2	4	2	8	0	6	2	8
B4D1C5	1	0	0	1	0	5	0	5	1	4	0	5	1	2	0	3
B4D2C3	2	3	3	8	1	7	0	8	2	6	0	8	0	7	1	8
B4D2C4	0	4	4	8	1	3	4	8	3	3	2	8	1	6	1	8
B4D2C5	0	1	0	1	0	4	0	4	2	0	0	2	1	2	1	4
	Trial 5				Trial 8				Trial 9				Trial 13			
	Direction				Direction				Direction				Direction			
	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T
B1D1C1	7	0	1	8	7	1	0	8	8	0	0	8	7	0	1	8
B1D1C2	7	0	1	8	5	0	3	8	7	0	1	8	6	0	2	8
B1D1C3	7	1	0	8	5	3	0	8	5	2	1	8	6	2	0	8
B1D1C5	1	1	1	3	3	0	0	3	4	0	0	4	3	1	0	4
B1D2C1	8	0	0	8	8	0	0	8	8	0	0	8	8[a]	0	0	8
B1D2C2	8	0	0	8	7	0	1	8	7	0	1	8	6	1	1	8
B1D2C3	4	3	1	8	4	2	2	8	5	2	1	8	3	4	1	8
B1D2C5	3	0	0	3	4	0	0	4	1	0	0	1	0	0	2	2
B2D1C1	7	0	1	8	7	0	1	8	8	0	0	8	8[a]	0	0	8
B2D1C2	5	0	3	8	6	2	0	8	7	0	1	8	7	0	1	8
B2D1C3	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B2D1C5	5	0	0	5	2	0	2	4	4	0	0	4	2	0	0	2
B2D2C1	8	0	0	8	8	0	0	8	6	0	2	8	7	0	1	8
B2D2C2	8	0	0	8	7	0	1	8	7	0	1	8	6	1	1	8
B2D2C3	5	0	3	8	5	1	2	8	6	1	1	8	2[a]	5	1	8
B2D2C5	4	1	0	5	5	0	0	5	4	0	0	4	2	0	0	2
B3D1C1	7	0	1	8	5	1	2	8	6	0	2	8	6	0	2	8
B3D1C2	5	1	2	8	4	2	2	8	5	2	1	8	5	2	1	8
B3D1C3	7	0	1	8	7	0	1	8	6	0	2	8	6	2	0	8
B3D1C5	4	1	0	5	7	0	0	7	2	0	0	2	4	0	1	5
B3D2C1	7	1	0	8	8	0	0	8	7	1	0	8	7	1	0	8
B3D2C2	6	2	0	8	7	0	1	8	7	1	0	8	7	1	0	8
B3D2C3	6	1	1	8	5	1	2	8	7	0	1	8	5	1	2	8
B3D2C5	5	0	0	5	4	0	0	4	4	1	1	6	0	1	0	1
B4D1C1	8	0	0	8	7	1	0	8	7	1	0	8	8[a]	0	0	8
B4D1C2	8	0	0	8	8	0	0	8	8	0	0	8	6	0	2	8
B4D1C3	8	0	0	8	8	0	0	8	8	0	0	8	5	2	1	8
B4D1C5	5	0	0	5	4	0	0	4	4	0	0	4	5	0	0	5
B4D2C1	7	1	0	8	7	1	0	8	7	1	0	8	8[a]	0	0	8
B4D2C2	8	0	0	8	8	0	0	8	8	0	0	8	8[a]	0	0	8
B4D2C3	8	0	0	8	7	1	0	8	8	0	0	8	6	1	1	8
B4D2C5	5	1	0	6	2	2	1	5	5	1	0	6	2	2	0	4

TABLE 109 (Continued)

Comparison	Trial 6				Trial 7				Trial 10				Trial 14			
	Direction				Direction				Direction				Direction			
	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T
B1D1C2	0	8	0	8	0	6	2	8	0	3	5	8	0	4	4	8
B1D1C3	1	6	1	8	3	3	2	8	2	3	3	8	1	7	0	8
B1D1C4	0	8	0	8	1	7	0	8	0	8	0	8	0	8	0	8
B1D1C5	0	2	0	2	0	3	1	4	0	1	1	2	1	5	0	6
B1D2C2	1	6	1	8	0	8	0	8	0	6	2	8	0	7	1	8
B1D2C3	2	3	3	8	0	6	2	8	1	4	3	8	0	6	2	8
B1D2C4	1	6	1	8	2	6	0	8	1	7	0	8	3	5	0	8
B1D2C5	2	1	2	5	1	1	1	3	0	2	1	3	1	3	1	4
B2D1C2	0	6	2	8	1	5	2	8	1	5	2	8	1	6	1	8
B2D1C3	0	7	1	8	0	6	2	8	0	6	2	8	1	6	1	8
B2D1C4	2	6	0	8	2	6	0	8	4	4	0	8	1	7	0	8
B2D1C5	0	0	3	3	2	2	1	5	1	1	1	3	1	3	1	5
B2D2C2	0	7	1	8	4	4	0	8	0	8	0	8	1	5	2	8
B2D2C3	0	7	1	8	0	7	1	8	0	6	2	8	3	4	1	8
B2D2C4	1	6	1	8	2	6	0	8	0	6	2	8	3	5	0	8
B2D2C5	0	4	1	5	0	1	0	1	0	1	1	2	1	4	0	5
B3D1C2	0	5	3	8	2	5	1	8	2	4	2	8	1	4	3	8
B3D1C3	0	6	2	8	0	7	1	8	1	6	1	8	0	8	0	8
B3D1C4	1	5	2	8	1	6	1	8	0	7	1	8	1	5	2	8
B3D1C5	0	6	0	6	0	6	0	6	0	2	1	3	0	3	0	3
B3D2C2	0	8	0	8	2	5	1	8	1	7	0	8	0	8	0	8
B3D2C3	0	8	0	8	3	5	0	8	0	5	3	8	1	5	2	8
B3D2C4	1	7	0	8	0	8	0	8	1	7	0	8	0	8	0	8
B3D2C5	1	2	1	4	0	4	1	5	0	2	1	3	1	1	1	3
B4D1C2	1	4	3	8	1	7	0	8	0	5	3	8	1	7	0	8
B4D1C3	1	7	0	8	3	4	1	8	2	4	2	8	2	5	1	8
B4D1C4	0	7	1	8	1	5	2	8	0	5	3	8	0	5	3	8
B4D1C5	0	4	0	4	1	1	0	2	1	1	0	2	1	5	0	6
B4D2C2	1	7	0	8	1	7	0	8	1	6	1	8	0	6	2	8
B4D2C3	1	6	1	8	0	5	3	8	0	7	1	8	0	8	0	8
B4D2C4	2	5	1	8	2	4	2	8	0	7	1	8	2	5	1	8
B4D2C5	0	2	0	2	0	4	0	4	0	3	0	3	0	3	0	3

Table 109 (Continued)

Comparison	Trial 15				Trial 16				Trial 17			
	Direction				Direction				Direction			
	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T
B1D1C1	8[b]	0	0	8	7	0	1	8	7	1	0	8
B1D1C2	7	0	1	8	8	0	0	8	6	1	1	8
B1D1C3	6	2	0	8	7	1	0	8	6	1	1	8
B1D1C4	7	1	0	8	8	0	0	8	7	1	0	8
B1D1C5	4	1	0	5	4	0	0	4	3	0	0	3
B1D2C1	8[b]	0	0	8	8	0	0	8	8	0	0	8
B1D2C2	7	0	1	8	7	0	1	8	7	0	1	8
B1D2C3	2[b]	4	2	8	3	3	2	8	3	3	2	8
B1D2C4	6	2	0	8	7	0	1	8	8	0	0	8
B1D2C5	3	0	0	3	2	0	0	2	3	0	0	3
B2D1C1	8[b]	0	0	8	8	0	0	8	8	0	0	8
B2D1C2	6	2	0	8	6	2	0	8	6	1	1	8
B2D1C3	7	1	0	8	6	1	1	8	8	0	0	8
B2D1C4	4	3	1	8	5	3	0	8	5	3	0	8
B2D1C5	4	0	1	5	2	0	0	2	4	1	0	5
B2D2C1	7	0	1	8	8	0	0	8	7	0	1	8
B2D2C2	8[b]	0	0	8	7	1	0	8	5	3	0	8
B2D2C3	4	2	2	8	6	0	2	8	4	3	1	8
B2D2C4	6	0	2	8	5	1	2	8	4	0	4	8
B2D2C5	2	1	2	5	0	0	0	0	6	0	0	6
B3D1C1	6	0	2	8	6	0	2	8	6	0	2	8
B3D1C2	5	3	0	8	5	2	1	8	5	2	1	8
B3D1C3	7	0	1	8	8	0	0	8	7	1	0	8
B3D1C4	6	0	2	8	5	0	3	8	8	0	0	8
B3D1C5	3	1	0	4	2	1	0	3	4	0	0	4
B3D2C1	7	1	0	8	7	1	0	8	7	1	0	8
B3D2C2	6	1	1	8	8	0	0	8	6	2	0	8
B3D2C3	5	2	1	8	6	1	1	8	4	1	3	8
B3D2C4	4	2	2	8	5	1	2	8	4	2	2	8
B3D2C5	1	1	1	3	4	0	1	5	1	0	1	2
B4D1C1	6	2	0	8	8	0	0	8	8	0	0	8
B4D1C2	7	1	0	8	8	0	0	8	8	0	0	8
B4D1C3	6	2	0	8	7	0	1	8	6	1	1	8
B4D1C4[1]												
B4D1C5	5	0	1	6	4	1	1	6	4	1	0	5
B4D2C1	8[b]	0	0	8	7	1	0	8	8	0	0	8
B4D2C2	8[b]	0	0	8	8	0	0	8	8	0	0	8
B4D2C3	6	1	1	8	7	0	1	8	6	2	0	8
B4D2C4	7	0	1	8	7	1	0	8	4	3	1	8
B4D2C5	1	3	0	4	2	1	1	4	2	3	2	7

[a] Trial 13, SR: B2D2C3 < B1D2C1, B2D1C1, B4D1C1, B4D2C1, and B4D2C2.

[b] Trial 15, SR: B1D2C3 < B1D1C1, B1D2C1, B2D1C1, B2D2C2, B4D2C1, and B4D2C2.

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[1] By mistake, frequencies for the B4D1C4 group were omitted in the transfer of the data from the original tally sheets to the present table.

Table 110

Mean Attainment Time Scores: Concept Formation Verbal Task--Comparisons Over All B Groups

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	24.6877	20.3006	17.1270	18.0270
	B2	25.7855	19.4772	19.7389	18.8646
	B3	25.2771	19.8233	19.6294	18.6090
	B4	20.2241	15.9263	13.1143	14.0500
C	C1	23.0117	17.8471	16.3436	16.2261
	C2	24.6655	19.2460	18.0020	17.9663
	C3	26.9347	20.0331	18.4062	18.1359
	C4	23.4114	19.3428	18.0156	17.2058
	C5	23.2909	18.2344	16.5380	16.9656
	C6	22.6475	18.5876	17.1089	17.8261
D	D1	24.1957	18.9842	17.5854	17.4813
	D2	23.7915	18.7795	17.2193	17.2940

Table 111

Results of Analyses of Covariance Among Mean Attainment Time Scores: Concept Formation Verbal Task--Comparisons Over All B Groups

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Squar A4
Total	373	153.9734	72.4337	67.0728	63.5772
Regression	12	595.3913	426.8974	341.1551	256.9709
Error	361	139.3002	60.6509	57.9620	57.1485
B	3	263.9780	254.3653**	225.8238*	206.8444*
C	5	159.2094	40.3212	45.8378	32.8320
D	1	15.1859	3.8922	12.4535	3.2602
MA	1	2,528.2000***	1,341.7000***	1,783.9000***	1,470.0000*
CA	1	1,537.2000**	824.2000***	1,260.0000***	812.4000*
IQ	1	593.2500*	275.6250*	430.4375**	352.0625*

* P < .05
** P < .01
*** P < .001

Table 112

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Attainment Time Scores: Concept Formation Verbal Task--Comparisons Over All B Groups

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$z_{.05}^{S}$	$z_{.01}^{S}$	Results
B	A2	B1:B2	3.1891	22.8052	29.6780	B1=B2
		B1:B3	1.2630	21.6337	28.4284	B1=B3
		B1:B4	38.3849	23.5862	30.4590	B1>B4**
		B2:B3	1.7982	21.6337	28.4284	B2=B3
		B2:B4	12.3008	21.6337	28.4284	B2=B4
		B3:B4	9.5457	22.8052	29.6780	B3=B4
B	A3	B1:B2	10.1160	22.2504	28.9560	B1=B2
		B1:B3	6.6208	21.1074	27.7368	B1=B3
		B1:B4	35.2114	21.1074	27.7368	B1>B4**
		B2:B3	0.5690	21.1074	27.7368	B2=B3
		B2:B4	22.9483	23.0124	29.7180	B2=B4
		B3:B4	15.9587	22.2504	28.9560	B3=B4
B	A4	B1:B2	3.2442	22.0460	28.6900	B1=B2
		B1:B3	1.5400	20.9135	27.4820	B1=B3
		B1:B4	34.8982	20.9135	27.4820	B1>B4**
		B2:B3	1.3280	20.9135	27.4820	B2=B3
		B2:B4	16.6784	22.8010	29.4450	B2=B4
		B3:B4	11.1674	22.0460	28.6900	B3=B4

** $P < .01$

Table 113

Mean Attainment Time Scores: Concept Formation Verbal Task--Comparisons Within the B1 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	24.0719	19.7502	17.8424	18.7748
	C2	27.7931	21.7738	20.5876	19.8395
	C3	30.8534	25.2706	21.2425	20.8786
	C4	25.8642	23.9117	20.3426	19.1103
	C5	30.0915	22.8069	20.4015	20.5365
	C6	27.7136	23.6515	20.3242	20.5213
D	D1	27.2814	22.9737	19.9138	19.6946
	D2	28.1812	22.7479	20.3332	20.1924

Table 114

Results of Analyses of Covariance Among Mean Attainment Time Scores: Concept Formation Verbal Task--Comparisons Within the B1 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Squar A4
Total	90	99.2281	54.0671	36.4721	36.5513
Regression	9	128.3207	46.4521	25.6489	35.4583
Error	81	95.9956	54.9132	37.6747	36.6728
C	5	97.8972	56.9608	21.4082	11.0812
D	1	18.2984	1.1528	3.9765	5.6031
MA	1	95.2867	10.6399	60.6958	53.1643
CA	1	256.7000	36.5333	86.3667	124.1000
IQ	1	157.5492	16.4978	71.4385	67.2081

Table 115

Mean Attainment Time Scores: Concept Formation Verbal Task--Comparisons Within the B2 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	22.0107	16.1015	15.8532	15.6542
	C2	22.8518	17.3435	16.6637	17.1646
	C3	25.2092	17.7442	17.4567	16.3895
	C4	19.9984	15.8556	15.2965	15.0399
	C5	21.7825	16.5062	16.1560	17.7510
	C6	19.7437	15.3816	14.7145	15.4112
D	D1	21.8458	16.4432	16.2246	16.3124
	D2	22.0196	16.5344	15.8223	16.1577

Table 116

Results of Analyses of Covariance Among Mean Attainment Time Scores: Concept Formation Verbal Task--Comparisons Within the B2 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	94	41.5834	19.9362	19.6252	25.7363
Regression	9	55.0251	29.5773	28.8285	26.3398
Error	85	40.1602	18.9154	18.6507	25.6724
C	5	60.6812	12.4473	14.5641	17.7581
D	1	0.6484	0.1784	3.4691	0.5129
MA	1	7.0128	70.5391	33.6159	71.9270
CA	1	8.7950	81.7746*	46.8345	86.8249
IQ	1	19.8798	93.1102*	49.8818	81.5233

* $P < .05$

Table 117

Mean Attainment Time Scores: Concept Formation Verbal Task--Comparisons Within the B3 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	20.8538	15.8163	14.8675	15.3683
	C2	22.2974	16.4678	15.9218	16.1128
	C3	18.9391	14.3537	13.5244	14.1743
	C4	19.5738	15.0639	14.5506	14.6176
	C5	21.5125	17.1078	15.6527	16.4045
	C6	19.5731	15.4608	14.8055	15.9476
D	D1	19.5295	15.0595	14.3594	15.0443
	D2	21.3871	16.3640	15.4148	15.8308

Table 118

Results of Analvses of Covariance Among Mean Attainment Time Scores: Concept Formation Verbal Task--Comparisons Within the B3 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	92	50.0163	29.3239	21.7392	25.3147
Regression	9	71.4112	48.8708	40.0418	44.1046
Error	83	47.6964	27.2044	19.7546	23.2772
C	5	25.3628	14.8727	11.0922	12.0527
D	1	78.4282	38.6746	25.3118	14.0573
MA	1	13.6734	5.0143	5.4756	9.3954
CA	1	0.1812	1.8116	0.9656	0.2319
IQ	1	7.3421	0.5296	0.0691	0.0954

Table 119

Mean Attainment Time Scores: Concept Formation Verbal Task--Comparisons Within the B4 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	24.3683	19.3668	16.3703	14.6571
	C2	25.1421	20.7772	18.1582	17.8826
	C3	32.1072	21.8963	20.4306	20.0688
	C4	26.7978	21.8812	20.9438	19.2805
	C5	23.6733	19.1814	17.1237	16.3477
	C6	23.9558	20.2299	18.9239	19.7510
D	D1	28.3336	21.5268	19.7596	18.7141
	D2	23.6813	19.5842	17.5572	17.2818

Table 120

Results of Analyses of Covariance Among Mean Attainment Time Scores: Concept Formation Verbal Task--Comparisons Within the B4 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	94	391.4024	153.4180	173.4350	155.1012
Regression	9	856.6679	400.0745	536.0074	469.43 2
Error	85	342.1390	127.3014	135.0450	121.8183
C	5	161.9963	21.9105	50.6652	72.5800
D	1	507.6004	88.5009	113.7505	48.1060
MA	1	1,733.6997*	1,001.4345**	1,348.9457**	1,242.2843**
CA	1	2,833.0286**	1,568.8000***	2,130.8571***	1,873.6571***
IQ	1	888.4292	536.9265*	739.7200*	684.1341*

* $P < .05$
** $P < .01$
*** $P < .001$

Table 121

Mean Attainment Time Scores: Concept Formation Verbal Task--Comparisons of the Four B Groups (MA, CA, and IQ Not Controlled Statistically)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	27.6507	22.8128	20.0960	19.9277
	B2	21.9286	16.4871	16.0174	16.2310
	B3	20.4039	15.6887	14.8649	15.4213
	B4	25.9912	20.5386	18.6313	17.9704

Table 122

Results of Analyses of Covariance Among Mean Attainment Time Scores: Concept Formation Verbal Task--Comparisons of the Four B Groups (MA, CA, and IQ Not Controlled Statistically)

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	373	153.97	72.43	67.07	63.58
Regression	9	437.45	372.06	200.31	137.62
Error	364	146.96	65.03	63.78	61.75
		1065.58***	1052.31***	527.75***	368.27***

Table 123

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Attainment Time Scores: Concept Formation Verbal Task--Comparisons of the Four B Groups (MA, CA, and IQ Not Controlled Statistically)

Vari- able	Level of Practice	Compari- son	$\frac{(b_i - b_j) \times}{\sqrt{2}/c_{ii} + c_{jj} - 2c_{ij}}$	$z_{.05}S$	$z_{.01}S$	Results
B	A1	B1:B2	55.24	35.40	46.06	B1>B2**
		B1:B3	69.31	36.61	47.28	B1>B3**
		B1:B4	15.97	33.58	44.12	B1=B4
		B2:B3	15.76	33.58	44.12	B2=B3
		B2:B4	42.33	33.58	44.12	B2<B4*
		B3:B4	56.01	35.40	46.06	B3<B4**

Table 123 (Continued)

Variable	Level of Practice	Comparison	$\frac{(b_i - b_j) x}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$z_{.05}S$	$z_{.01}S$	Results
B	A2	B1:B2	60.92	23.55	30.64	B1>B2**
		B1:B3	68.07	24.35	31.45	B1>B3**
		B1:B4	21.93	22.34	29.35	B1=B4
		B2:B3	18.67	22.34	29.35	B2=B3
		B2:B4	42.02	22.34	29.35	B2<B4**
		B3:B4	48.50	23.55	30.64	B3<B4**
B	A3	B1:B2	39.33	23.32	30.35	B1>B2**
		B1:B3	50.00	24.12	31.15	B1>B3**
		B1:B4	13.95	22.12	29.07	B1=B4
		B2:B3	12.03	22.12	29.07	B2=B3
		B2:B4	27.25	22.12	29.07	B2<B4*
		B3:B4	37.88	23.32	30.35	B3<B4**
B	A4	B1:B2	35.67	22.95	29.86	B1>B2**
		B1:B3	43.12	23.73	30.65	B1>B3**
		B1:B4	9.14	21.77	28.60	B1=B4
		B2:B3	8.40	21.77	28.60	B2=B3
		B2:B4	28.50	21.77	28.60	B2<B4*
		B3:B4	35.67	22.95	29.86	B3<B4**

* $P < .05$
** $P < .01$

Table 124

Mean Number of Responses Scores: Concept Formation Verbal Task

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	52.9441	36.9558	31.7357	21.1819
	B2	43.6950	24.4819	23.6024	16.2497
	B3	44.9408	26.0121	25.8374	18.1710
	B4	49.8881	36.1317	31.4368	20.9054
C	C1	46.5013	29.0682	26.0576	18.1669
	C2	49.7957	33.7302	31.5005	21.5719
	C3	49.3212	31.0689	27.7537	18.8991
	C4	47.4741	31.2828	27.8329	19.0461
	C5	48.1307	31.0604	28.6816	18.4205
	C6	45.9789	29.1616	27.0120	18.6573
D	D1	48.6024	31.5477	28.9550	19.3369
	D2	47.1316	30.2430	27.3511	18.9170
S	S1	48.4479	32.0141	29.3948	19.3106
	S2	47.2862	29.7766	26.9113	18.9433
BC	B1C1	54.3344	37.9079	31.9023	23.0019
	B1C2	52.9956	38.0837	35.6661	22.6982
	B1C3	54.0067	36.9228	30.2323	20.0790
	B1C4	50.9092	37.5894	30.9109	20.4288
	B1C5	52.9498	35.6313	31.9726	20.6320
	B1C6	52.4691	35.5994	29.7298	20.2514
	B2C1	42.9132	22.6099	22.0070	14.7224
	B2C2	47.1395	29.3361	28.0159	20.5096
	B2C3	47.0887	25.7497	24.2986	16.5591
	B2C4	40.8554	22.4292	21.5996	14.6628
	B2C5	43.7954	24.6233	25.7826	16.2790
	B2C6	40.3779	22.1432	19.9108	14.7651
	B3C1	40.0139	22.0539	22.7564	16.3532
	B3C2	46.9558	27.8783	28.2253	19.5469
	B3C3	48.0145	28.1202	26.9242	19.8344
	B3C4	47.3536	25.9939	25.2981	16.8618
	B3C5	47.6499	28.0941	26.3415	18.0648
	B3C6	40.4429	23.9322	25.4790	18.3646

Table 124 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
BC (Continued)	B4C1	48.7437	33.7012	27.5646	18.5901
	B4C2	52.0919	39.6226	34.3077	23.5328
	B4C3	48.1752	33.4831	29.5598	19.1240
	B4C4	51.5641	39.1189	33.5232	24.2310
	B4C5	48.1278	35.8928	30.6298	18.7062
	B4C6	50.6257	34.9715	32.9286	21.2482
BD	B1D1	53.4392	38.6416	33.2094	21.6803
	B2D1	44.6635	25.5472	25.3088	16.8623
	B3D1	45.6478	25.5608	25.4116	18.2227
	B4D1	50.6590	36.4413	31.8901	20.5826
	B1D2	52.4491	35.2699	30.2619	20.6835
	B2D2	42.7265	23.4166	21.8960	15.6371
	B3D2	44.2338	26.4634	26.2632	18.1193
	B4D2	49.1172	35.8220	30.9834	21.2282
BS	B1S1	53.0189	38.9916	33.3041	22.0044
	B2S1	45.3861	25.6776	25.5931	16.8289
	B3S1	45.5381	26.8715	25.8082	17.5454
	B4S1	49.8483	36.5157	32.8740	20.8638
	B1S2	52.8694	34.9199	30.1673	20.3593
	B2S2	42.0039	23.2862	21.6117	15.6705
	B3S2	44.3435	25.1527	25.8667	18.7965
	B4S2	49.9278	35.7477	29.9995	20.9470
CS	C1S1	47.7000	30.4685	28.3647	19.3231
	C2S1	48.7404	33.0756	31.9777	20.8283
	C3S1	47.5758	30.7150	28.5021	17.8852
	C4S1	49.3096	35.0149	30.0725	20.4763
	C5S1	49.0854	32.4183	29.5989	18.1267
	C6S1	48.2759	30.3922	27.8531	19.2241
	C1S2	45.3026	27.6680	23.7504	17.0107
	C2S2	50.8510	30.8382	31.1833	22.3155
	C3S2	51.0667	31.4229	27.0053	19.9130
	C4S2	45.6387	27.5507	25.5934	17.6159
	C5S2	47.1760	29.7025	27.7644	18.7143
	C6S2	43.6819	27.9309	26.1710	18.0905

Table 124 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
CD	C1D1	46.2969	28.8313	25.8029	18.3284
	C2D1	51.8857	35.0123	32.9734	22.0646
	C3D1	49.3680	30.7963	27.9488	18.4120
	C4D1	48.3287	31.8452	28.7292	19.6234
	C5D1	47.5900	31.6960	29.7156	18.3783
	C6D1	48.1449	31.1053	28.5601	19.2151
	C1D2	46.7058	29.3052	26.3123	18.0055
	C2D2	47.7057	32.4481	30.1877	21.0792
	C3D2	49.2744	30.4492	27.5587	19.3862
	C4D2	46.6196	30.7205	26.9366	18.4689
	C5D2	46.6734	30.6267	27.6477	18.4627
	C6D2	43.8129	27.2178	25.4640	18.0996

Table 125

Results of Analyses of Covariance Among Mean Number of Responses Scores: Concept Formation Verbal Task

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Squar A4
Total	372	97.4805	114.7492	83.7175	38.3609
Regression	44	277.2170	397.4645	253.8355	115.6711
Error	328	73.3695	76.8239	60.8968	27.8985
B	3	474.5883***	612.8054***	323.7110**	142.9871**
C	5	142.6461	180.5630*	222.0822**	95.8351**
D	1	194.6094	153.1633	231.4282	15.8664
S	1	116.8847	433.5973*	534.2076**	11.6848
BC	15	90.4388	54.9973	48.3686	44.4520
BD	3	3.3322	76.8597	86.6021	16.3833
BS	3	53.8181	40.9795	68.1017	36.7876
CD	5	83.4575	45.0622	29.4519	10.8158
CS	5	157.3259	146.5957	39.0428	60.6581
MA	1	242.8420	483.4263*	300.0077*	142.1235*
CA	1	43.1194	3.4259	13.3433	4.8586
IQ	1	29.4473	0.7981	11.2704	7.6454

* $P < .05$
** $P < .01$
*** $P < .001$

Table 126

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Number of Responses Scores: Concept Formation Verbal Task

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2}/\sqrt{c_{ii}+c_{jj}-2c_{ij}}$	$z_{.05}S$	$z_{.01}S$	Results
B	A1	B1:B2	34.6074	25.8814	33.4230	B1>B2**
		B1:B3	19.6042	25.0244	32.5660	B1=B3
		B1:B4	26.2892	23.7389	31.1948	B1>B4*
		B2:B3	6.3522	23.7389	31.1948	B2=B3
		B2:B4	20.5398	25.0244	32.5660	B2=B4
		B3:B4	11.0626	23.7389	31.1948	B3=B4
B	A2	B1:B2	46.6735	26.4552	34.1640	B1>B2**
		B1:B3	26.8065	25.5792	33.2880	B1>B3*
		B1:B4	7.0889	24.2652	31.8864	B1=B4
		B2:B3	7.8026	24.2652	31.8864	B2=B3
		B2:B4	38.6378	25.5792	33.2880	B2<B4**
		B3:B4	22.6284	24.2652	31.8864	B3=B4
B	A3	B1:B2	30.4322	23.5560	30.4200	B1>B2**
		B1:B3	14.4477	22.7760	29.6400	B1=B3
		B1:B4	2.5711	21.6060	28.3920	B1=B4
		B2:B3	11.3964	21.6060	28.3920	B2=B3
		B2:B4	25.9834	22.7760	29.6400	B2<B4*
		B3:B4	12.5207	21.6060	28.3920	B3=B4
B	A4	B1:B2	18.4548	15.9456	20.5920	B1>B2*
		B1:B3	7.3752	15.4176	20.0640	B1=B3
		B1:B4	2.3784	14.6256	19.2192	B1=B4
		B2:B3	9.7967	14.6256	19.2192	B2=B3
		B2:B4	15.4411	15.4176	20.0640	B2<B4*
		B3:B4	6.1144	14.6256	19.2192	B3=B4
C	A2	C1:C2	36.1114	27.5940	35.3904	C1<C2**
		C1:C3	15.4975	26.4552	34.1640	C1=C3
		C1:C4	16.8660	27.0684	34.8648	C1=C4
		C1:C5	15.3017	25.5792	33.2880	C1=C5
		C1:C6	0.7230	24.2652	31.8864	C1=C6
		C2:C3	21.1230	25.5792	33.2880	C2=C3
		C2:C4	19.1142	24.2652	31.8864	C2=C4
		C2:C5	21.0221	26.4552	34.1640	C2=C5
		C2:C6	36.2623	27.0684	34.8648	C2>C6**
		C3:C4	1.6705	24.2652	31.8864	C3=C4
		C3:C5	0.0670	24.2652	31.8864	C3=C5
		C3:C6	15.1394	25.5792	33.2880	C3=C6

Table 125 (Continued)

Vari-able	Level of Practice	Compari-son	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$a_{.05}S$	$a_{.01}S$	Results
C	A2	C4:C5	1.7233	25.5792	33.2880	C4=C5
(Continued)		C4:C6	16.4313	26.4552	34.1640	C4=C6
		C5:C6	14.8299	24.2652	31.8864	C5=C6
C	A3	C1:C2	42.7806	24.5700	31.5120	C1<C2**
		C1:C3	13.1383	22.7760	29.6400	C1=C3
		C1:C4	13.5208	23.5560	30.4200	C1=C4
		C1:C5	20.1556	24.1020	31.0440	C1=C5
		C1:C6	7.3932	21.6060	28.3920	C1=C6
		C2:C3	30.3744	23.5560	30.4200	C2>C3*
		C2:C4	29.2693	22.7760	29.6400	C2>C4*
		C2:C5	22.8258	21.6060	28.3920	C2>C5*
		C2:C6	36.2613	24.1020	31.0440	C2>C6**
		C3:C4	0.6187	21.6060	28.3920	C3=C4
		C3:C5	7.2472	22.7760	29.6400	C3=C5
		C3:C6	5.8869	21.6060	28.3920	C3=C6
		C4:C5	6.5740	21.6060	28.3920	C4=C5
		C4:C6	6.3587	22.7760	29.6400	C4=C6
		C5:C6	13.0398	23.5560	30.4200	C5=C6
C	A4	C1:C2	26.3747	16.6320	21.3312	C1<C2**
		C1:C3	5.6714	15.9456	20.5920	C1=C3
		C1:C4	6.6957	16.3152	21.0144	C1=C4
		C1:C5	1.9478	14.6256	19.2192	C1=C5
		C1:C6	3.7988	15.4176	20.0640	C1=C6
		C2:C3	21.2147	15.4176	20.0640	C2>C3**
		C2:C4	19.7268	14.6256	19.2192	C2>C4**
		C2:C5	24.8139	16.3152	21.0144	C2>C5**
		C2:C6	23.1335	15.9456	20.5920	C2>C6**
		C3:C4	1.1482	14.6256	19.2192	C3=C4
		C3:C5	3.7379	15.4176	20.0640	C3=C5
		C3:C6	1.9188	14.6256	19.2192	C3=C6
		C4:C5	4.8459	15.9456	20.5920	C4=C5
		C4:C6	3.0113	15.4176	20.0640	C4=C6
		C5:C6	1.8498	14.6256	19.2192	C5=C6
S	A2	S1:S2	29.4294	24.2652	31.8864	S1>S2*
S	A3	S1:S2	32.6658	21.6060	28.3920	S1>S2**

Table 127

Mean Absolute Goal Discrepancy Scores: Concept Formation Verbal Task

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	1.5715	18.9816	15.3821	9.8319
	B2	4.4169	16.0351	20.0570	7.4498
	B3	5.7684	26.1270	31.6859	9.7248
	B4	0.8176	14.0711	8.6422	7.9347
C	C1	2.6821	16.1533	17.3382	9.3770
	C2	3.5011	17.6621	16.3469	7.9190
	C3	3.0099	19.4321	19.2115	7.2594
	C4	3.2412	24.3900	28.4969	9.9032
	C5	3.2837	16.3810	13.3155	9.2179
D	D1	3.0494	18.6254	19.7567	9.0589
	D2	3.2378	18.9820	18.1269	8.4117
S	S1	2.9235	21.3914	21.7628	10.0198
	S2	3.3637	16.2160	16.1208	7.4508
BC	B1C1	0.3767	12.2233	12.9123	10.0712
	B1C2	2.0085	16.0933	11.1965	8.4524
	B1C3	0.7740	17.1493	15.6833	6.7353
	B1C4	2.1114	25.4460	23.2079	12.0064
	B1C5	2.5869	23.9961	13.9105	11.8942
	B2C1	4.8538	17.5454	23.1603	9.0627
	B2C2	3.2417	15.0821	18.1766	6.6659
	B2C3	6.2757	11.9638	18.1927	6.2604
	B2C4	4.0500	23.1329	28.1572	8.5090
	B2C5	3.6633	12.4513	12.5982	6.7510
	B3C1	4.9732	20.9321	26.5755	8.8793
	B3C2	9.1404	26.0567	25.6278	10.0084
	B3C3	5.1308	34.1217	33.7482	9.1308
	B3C4	4.9966	30.1279	53.0475	12.3253
	B3C5	4.6010	19.3966	19.4305	12.1346
	B4C1	0.5247	13.9124	6.7047	9.4948
	B4C2	-0.3862	13.4163	10.3867	6.5493
	B4C3	-0.1409	14.4936	9.2218	6.9111
	B4C4	1.8068	20.4616	9.5750	6.7721
	B4C5	2.2836	9.6800	7.3228	9.9462

Table 127 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
BD	B1D1	2.0222	18.9867	15.7098	10.1974
	B2D1	4.3464	17.1744	21.2810	6.6872
	B3D1	4.9350	21.8340	30.9468	9.2617
	B4D1	0.8940	16.5065	11.0892	10.0893
	B1D2	1.1208	18.9765	15.0544	9.4664
	B2D2	4.4874	14.8958	18.8330	8.2124
	B3D2	6.6018	30.4200	32.4250	10.1879
	B4D2	0.7412	11.6357	6.1952	5.7801
BS	B1S1	0.9667	21.1667	15.6459	10.5126
	B2S1	4.1665	17.5574	22.6536	9.2516
	B3S1	5.1908	30.1988	37.8240	11.4922
	B4S1	1.3700	16.6427	10.9277	8.8228
	B1S2	2.1763	16.7965	15.1183	9.1512
	B2S2	4.6673	14.5128	17.4604	5.6480
	B3S2	6.3460	22.0552	25.5478	7.9574
	B4S2	0.2652	11.4995	6.3567	7.0466
CD	C1D1	2.2581	16.8000	17.6297	10.7859
	C2D1	3.2847	18.2464	18.6093	7.8539
	C3D1	2.7014	13.8453	16.1453	7.3479
	C4D1	3.9288	29.0976	33.4929	9.9794
	C5D1	3.0740	15.1377	12.9063	9.3274
	C1D2	3.1061	15.5066	17.0467	7.9681
	C2D2	3.7175	17.0778	14.0845	7.9841
	C3D2	3.3184	25.0189	22.2777	7.1709
	C4D2	2.5536	19.6824	23.5009	9.8270
	C5D2	3.4934	17.6243	13.7247	9.1084
CS	C1S1	3.0382	16.1766	17.6053	9.8881
	C2S1	2.3381	18.4076	20.0551	9.8059
	C3S1	2.7804	23.2170	21.3674	8.1694
	C4S1	3.6951	30.2106	35.0397	10.6849
	C5S1	2.7657	18.9452	14.7465	12.7555
	C1S2	2.3260	16.1300	22.7131	8.8659
	C2S2	4.6641	16.9166	18.2807	7.2369
	C3S2	3.2394	15.6472	22.6976	6.3494
	C4S2	2.7873	18.5694	27.5961	9.1215
	C5S2	3.8017	13.8168	17.5265	5.6803

Table 127 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
DS	D1S1	b2.8230	21.4827	22.9703	10.5756
	D2S1	3.0114	21.8393	21.3405	9.9284
	D1S2	3.2758	15.7681	16.5431	7.5422
	D2S2	3.4624	16.1247	14.9133	6.8950

Table 128

Results of Analyses of Covariance Among Mean Absolute Goal Discrepancy Scores: Concept Formation Verbal Task

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	310	26.65	795.39	831.78	147.66
Regression	39	103.43	3,389.02	3,675.01	677.54
Error	271	15.60	422.14	422.61	71.40
B	3	20.12	860.57	930.78	98.10
C	4	5.86	676.56	1,959.88**	73.64
D	1	2.63	9.42	196.75	31.03
S	1	13.81	1,908.95*	2,268.71*	470.35*
BC	12	36.08*	273.65	463.80	35.15
BD	3	22.10	634.86	135.09	127.07
BS	3	20.58	85.61	438.09	24.71
CD	4	11.85	834.72	548.73	22.25
CS	4	26.26	317.27	333.37	35.19
DS	1	0.01	20.33	43.12	15.08
MA	1	1.93	16.05	1,160.76	162.18
CA	1	16.56	219.06	81.77	1.79
IQ	1	1.08	339.83	18.79	1.02

* P < .05
** P < .01

Table 129

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Absolute Goal Discrepancy Scores: Concept Formation Verbal Task

Variable	Level of Practice	Comparison	$\frac{(b_i - b_j) \times}{\sqrt{2/c_{ii} + c_{jj} - 2c_{ij}}}$	$z_{.05}S$	$z_{.01}S$	Results
C	A3	C1:C2	7.7425	56.9437	74.8286	C1=C2
		C1:C3	14.5103	56.9437	74.8286	C1=C3
		C1:C4	85.7111	60.0273	78.1177	C1<C4**
		C1:C5	31.1605	60.0273	78.1177	C1=C5
		C2:C3	22.7372	60.0273	78.1177	C2=C3
		C2:C4	94.1141	62.0830	80.1735	C2<C4**
		C2:C5	24.0616	56.9437	74.8286	C2=C5
		C3:C4	71.9249	56.9437	74.8286	C3<C4*
		C3:C5	46.0494	62.0830	80.1735	C3=C5
		C4:C5	117.5958	63.5221	81.8181	C4>C5**
S	A3	S1:S2	67.4687	56.9437	74.8286	S1>S2*
S	A4	S1:S2	30.7209	23.4065	30.7580	S1>S2*
BC	A1	B4C2:B2C2	0.1247	10.9415	14.3780	B4C2=B2C2
		B4C2:B3C5	1.3188	11.5340	15.0100	B4C2=B3C5
		B4C2:B2C5	3.5326	11.9290	15.4050	B4C2=B2C5
		B4C2:B3C4	3.6612	12.2055	15.7210	B4C2=B3C4
		B4C2:B4C3	3.3751	12.4425	15.9580	B4C2=B4C3
		B4C2:B1C1	4.3025	12.6005	16.1555	B4C2=B1C1
		B4C2:B1C3	4.6636	12.7585	16.3530	B4C2=B1C3
		B4C2:B3C3	5.5952	12.8770	16.4715	B4C2=B3C3
		B4C2:B2C4	5.8037	12.9955	16.5900	B4C2=B2C4
		B4C2:B3C1	6.4958	13.0943	16.7085	B4C2=B3C1
		B4C2:B1C2	7.1521	13.1930	16.8270	B4C2=B1C2
		B4C2:B4C1	7.7363	13.2720	16.9257	B4C2=B4C1
		B4C2:B1C4	10.6020	13.3510	17.0245	B4C2=B1C4
		B4C2:B1C5	12.6611	13.4103	17.0837	B4C2=B1C5
		B4C2:B4C4	10.9696	13.4695	17.1430	B4C2=B4C4
		B4C2:B2C1	13.0155	13.5287	17.2220	B4C2=B2C1
		B4C2:B4C5	12.9118	13.5880	17.3010	B4C2=B4C5
		B4C2:B2C3	18.8049	13.6473	17.3603	B4C2<B2C3**
		B4C2:B3C2	19.9455	13.7065	17.4195	B4C2<B3C2**
		B2C2:B3C5	1.1916	10.9415	14.3780	B2C2=B3C5
		B2C2:B2C5	2.9283	11.5340	15.0100	B2C2=B2C5
		B2C2:B3C4	3.5099	11.9290	15.4050	B2C2=B3C4
		B2C2:B4C3	3.8122	12.2055	15.7210	B2C2=B4C3
		B2C2:B1C1	4.2300	12.4425	15.9580	B2C2=B1C1
		B2C2:B1C3	4.5978	12.6005	16.1555	B2C2=B1C3
		B2C2:B3C3	5.4439	12.7585	16.3530	B2C2=B3C3
		B2C2:B2C4	4.8951	12.8770	16.4716	B2C2=B2C4

Table 129 (Continued)

Variable	Level of Practice	Comparison	(b_i-b_j) x $\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$Z_{.05}^{S}$	$Z_{.01}^{S}$	Results
BC (Continued)	A1	B2C2:B3C1	6.3445	12.9955	16.5900	B2C2=B3C1
		B2C2:B1C2	7.2099	13.0943	16.7085	B2C2=B1C2
		B2C2:B4C1	9.0024	13.1930	16.8270	B2C2=B4C1
		B2C2:B1C4	10.4507	13.2720	16.9257	B2C2=B1C4
		B2C2:B1C5	12.5124	13.3510	17.0245	B2C2=B1C5
		B2C2:B4C4	12.8282	13.4103	17.0837	B2C2=B4C4
		B2C2:B2C1	10.8721	13.4695	17.1430	B2C2=B2C1
		B2C2:B4C5	14.8539	13.5287	17.2220	B2C2<B4C5*
		B2C2:B2C3	16.1546	13.5880	17.3010	B2C2<B2C3*
		B2C2:B3C2	20.3355	13.6473	17.3603	B2C2<B3C2**
		B3C5:B2C5	1.8037	10.9415	14.3780	B3C5=B2C5
		B3C5:B3C4	1.9592	11.5340	15.0100	B3C5=B3C4
		B3C5:B4C3	2.5542	11.9290	15.4050	B3C5=B4C3
		B3C5:B1C1	2.9837	12.2055	15.7210	B3C5=B1C1
		B3C5:B1C3	3.4061	12.4425	15.9580	B3C5=B1C3
		B3C5:B3C3	3.6826	12.6005	16.1555	B3C5=B3C3
		B3C5:B2C4	4.4607	12.7585	16.3530	B3C5=B2C4
		B3C5:B3C1	4.3549	12.8770	16.4715	B3C5=B3C1
		B3C5:B1C2	7.3393	12.9955	16.5900	B3C5=B1C2
		B3C5:B4C1	7.8108	13.0943	16.7085	B3C5=B4C1
		B3C5:B1C4	9.2591	13.1930	16.8270	B3C5=B1C4
		B3C5:B1C5	9.2607	13.2720	16.9257	B3C5=B1C5
		B3C5:B4C4	11.6365	13.3510	17.0245	B3C5=B4C4
		B3C5:B2C1	11.4623	13.4103	17.0837	B3C5=B2C1
		B3C5:B4C5	11.4787	13.4695	17.1430	B3C5=B4C5
		B3C5:B2C3	17.4619	13.5287	17.2220	B3C5<B2C3**
		B3C5:B3C2	19.8060	13.5880	17.3010	B3C5<B3C2**
		B2C5:B3C4	0.1286	10.9415	14.3780	B2C5=B3C4
		B2C5:B4C3	0.3646	11.5340	15.0100	B2C5=B4C3
		B2C5:B1C1	0.8488	11.9290	15.4050	B2C5=B1C1
		B2C5:B1C3	1.2165	12.2055	15.7210	B2C5=B1C3
		B2C5:B3C3	2.0626	12.4425	15.9580	B2C5=B3C3
		B2C5:B2C4	1.9669	12.6005	16.1555	B2C5=B2C4
		B2C5:B3C1	2.9632	12.7585	16.3530	B2C5=B3C1
		B2C5:B1C2	5.1497	12.8770	16.4715	B2C5=B1C2
		B2C5:B4C1	5.6212	12.9955	16.5900	B2C5=B4C1
		B2C5:B1C4	7.0694	13.0943	16.7085	B2C5=B1C4
		B2C5:B1C5	7.7109	13.1930	16.8270	B2C5=B1C5
		B2C5:B4C4	9.4469	13.2720	16.9257	B2C5=B4C4
		B2C5:B2C1	8.0145	13.3510	17.0245	B2C5=B2C1
		B2C5:B4C5	9.6750	13.4103	17.0837	B2C5=B4C5
		B2C5:B2C3	13.2263	13.4695	17.1430	B2C5=B2C3
		B2C5:B3C2	20.6802	13.5287	17.2220	B2C5<B3C2**
		B3C4:B4C3	0.2360	10.9415	14.3780	B3C4=B4C3
		B3C4:B1C1	0.7072	11.5340	15.0100	B3C4=B1C1

Table 129 (Continued)

Variable	Level of Practice	Comparison	$(b_i - b_j) \times \sqrt{2/c_{ii} + c_{jj} - 2c_{ij}}$	$Z_{.05}S$	$Z_{.01}S$	Results
BC (Continued)	A1	B3C4:B1C3	1.0683	11.9290	15.4050	B3C4:B1C3
		B3C4:B3C3	1.6749	12.2055	15.7210	B3C4=B3C3
		B3C4:B2C4	1.7649	12.4425	15.9580	B3C4=B2C4
		B3C4:B3C1	2.3957	12.6005	16.1555	B3C4=B3C1
		B3C4:B1C2	5.0211	12.7585	16.3530	B3C4=B1C2
		B3C4:B4C1	5.3937	12.8770	16.4715	B3C4=B4C1
		B3C4:B1C4	5.7176	12.9955	16.5900	B3C4=B1C4
		B3C4:B1C5	9.0658	13.0943	16.7085	B3C4=B1C5
		B3C4:B4C4	7.6760	13.1930	16.8270	B3C4=B4C4
		B3C4:B2C1	9.3543	13.2720	16.9257	B3C4=B2C1
		B3C4:B4C5	11.4072	13.3510	17.0245	B3C4=B4C5
		B3C4:B2C3	15.1437	13.4103	17.0837	B3C4<B2C3*
		B3C4:B3C2	17.3692	13.4695	17.1430	B3C4<B3C2**
		B4C3:B1C1	0.4842	10.9415	14.3780	B4C3=B1C1
		B4C3:B1C3	0.7018	11.5340	15.0100	B4C3=B1C3
		B4C3:B3C3	1.4351	11.9290	15.4050	B4C3=B3C3
		B4C3:B2C4	1.9065	12.2055	15.7210	B4C3=B2C4
		B4C3:B3C1	2.5987	12.4425	15.9580	B4C3=B3C1
		B4C3:B1C2	4.7851	12.6005	16.1555	B4C3=B1C2
		B4C3:B4C1	4.4426	12.7585	16.3530	B4C3=B4C1
		B4C3:B1C4	6.7049	12.8770	16.4715	B4C3=B1C4
		B4C3:B1C5	8.8341	12.9955	16.5900	B4C3=B1C5
		B4C3:B4C4	7.8656	13.0943	16.7085	B4C3=B4C4
		B4C3:B2C1	9.1183	13.1930	16.8270	B4C3=B2C1
		B4C3:B4C5	9.6181	13.2720	16.9257	B4C3=B4C5
		B4C3:B2C3	12.5992	13.3510	17.0245	B4C3=B2C3
		B4C3:B3C2	20.3157	13.4103	17.0837	B4C3<B3C2**
		B1C1:B1C3	0.3108	10.9415	14.3780	B1C1=B1C3
		B1C1:B3C3	1.2139	11.5340	15.0100	B1C1=B3C3
		B1C1:B2C4	1.4224	11.9290	15.4050	B1C1=B2C4
		B1C1:B3C1	1.7418	12.2055	15.7210	B1C1=B3C1
		B1C1:B1C2	3.6349	12.4425	15.9580	B1C1=B1C2
		B1C1:B4C1	3.8264	12.6005	16.1555	B1C1=B4C1
		B1C1:B1C4	5.2574	12.7585	16.3530	B1C1=B1C4
		B1C1:B1C5	7.0117	12.8770	16.4715	B1C1=B1C5
		B1C1:B4C4	8.4433	12.9955	16.5900	B1C1=B4C4
		B1C1:B2C1	7.1124	13.0943	16.7085	B1C1=B2C1
		B1C1:B4C5	10.7000	13.1930	16.8270	B1C1=B4C5
		B1C1:B2C3	14.4236	13.2720	16.9257	B1C1<B2C3*
		B1C1:B3C2	19.8315	13.3510	17.0245	B1C1<B3C2**
		B1C3:B3C3	0.6970	10.9415	14.3780	B1C3=B3C3
		B1C3:B2C4	1.0546	11.5340	15.0100	B1C3=B2C4
		B1C3:B3C1	1.7153	11.9290	15.4050	B1C3=B3C1
		B1C3:B1C2	3.4062	12.2055	15.7210	B1C3=B1C2
		B1C3:B4C1	4.3253	12.4425	15.9580	B1C3=B4C1
		B1C3:B1C4	4.9466	12.6005	16.1555	B1C3=B1C4
		B1C3:B1C5	6.7088	12.7585	16.3530	B1C3=B1C5

Table 129 (Continued)

Variable	Level of Practice	Comparison	$\frac{(b_i-b_j) \times}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$Z_{.05}S$	$Z_{.01}S$	Results
BC (Continued)	A1	B1C3:B4C4	8.0822	12.8770	16.4715	B1C3=B4C4
		B1C3:B2C1	8.2664	12.9955	16.5900	B1C3=B2C1
		B1C3:B4C5	10.3389	13.0943	16.7085	B1C3=B4C5
		B1C3:B2C3	11.5785	13.1930	16.8270	B1C3=B2C3
		B1C3:B3C2	19.4637	13.2720	16.9257	B1C3<B3C2**
		B3C3:B2C4	0.2085	10.9415	14.3780	B3C3=B2C4
		B3C3:B3C1	0.7612	11.5340	15.0100	B3C3=B3C1
		B3C3:B1C2	3.0871	11.9290	15.4050	B3C3=B1C2
		B3C3:B4C1	3.5585	12.2055	15.7210	B3C3=B4C1
		B3C3:B1C4	5.0068	12.4425	15.9580	B3C3=B1C4
		B3C3:B1C5	7.1666	12.6005	16.1555	B3C3=B1C5
		B3C3:B4C4	7.3843	12.7585	16.3530	B3C3=B4C4
		B3C3:B2C1	7.4203	12.8770	16.4715	B3C3=B2C1
		B3C3:B4C5	9.6824	12.9955	16.5900	B3C3=B4C5
		B3C3:B2C3	11.1642	13.0943	16.7085	B3C3=B2C3
		B3C3:B3C2	16.1234	13.1930	16.8270	B3C3<B3C2*
		B2C4:B3C1	0.6921	10.9415	14.3780	B3C3=B3C1
		B2C4:B1C2	2.8786	11.5340	15.0100	B2C4=B1C2
		B2C4:B4C1	3.2897	11.9290	15.4050	B2C4=B4C1
		B2C4:B1C4	4.0553	12.2055	15.7210	B2C4=B1C4
		B2C4:B1C5	6.9619	12.4425	15.9580	B2C4=B1C5
		B2C4:B4C4	5.9111	12.6005	16.1555	B2C4=B4C4
		B2C4:B2C1	6.0950	12.7585	16.3530	B2C4=B2C1
		B2C4:B4C5	9.4739	12.8770	16.4715	B2C4=B4C5
		B2C4:B2C3	11.2594	12.9955	16.5900	B2C4=B2C3
		B2C4:B3C2	18.0776	13.0943	16.7085	B2C4<B3C2**
		B3C1:B1C2	2.1471	10.9415	14.3780	B3C1=B1C2
		B3C1:B4C1	2.1895	11.5340	15.0100	B3C1=B4C1
		B3C1:B1C4	4.1062	11.9290	15.4050	B3C1=B1C4
		B3C1:B1C5	6.2822	12.2055	15.7210	B3C1=B1C5
		B3C1:B4C4	6.3669	12.4425	15.9580	B3C1=B4C4
		B3C1:B2C1	5.3706	12.6005	16.1555	B3C1=B2C1
		B3C1:B4C5	8.6236	12.7585	16.3530	B3C1=B4C5
		B3C1:B2C3	12.3091	12.8770	16.4715	B3C1=B2C3
		B3C1:B3C2	14.9735	12.9955	16.5900	B3C1<B3C2*
		B1C2:B4C1	0.4715	10.9415	14.3780	B1C2=B4C1
		B1C2:B1C4	1.6626	11.5340	15.0100	B1C2=B1C4
		B1C2:B1C5	3.5589	11.9290	15.4050	B1C2=B1C5
		B1C2:B4C4	4.2972	12.2055	15.7210	B1C2=B4C4
		B1C2:B2C1	4.3332	12.4425	15.9580	B1C2=B2C1
		B1C2:B4C5	6.5953	12.6005	16.1555	B1C2=B4C5
		B1C2:B2C3	10.1226	12.7585	16.3530	B1C2=B2C3
		B1C2:B3C2	13.1256	12.8770	16.4715	B1C2<B3C2*
		B4C1:B1C4	1.4483	10.9415	14.3780	B4C1=B1C4
		B4C1:B1C5	3.6722	11.5340	15.0100	B4C1=B1C5
		B4C1:B4C4	3.2333	11.9290	15.4050	B4C1=B4C4
		B4C1:B2C1	3.1811	12.2055	15.7210	B4C1=B2C1

Table 129 (Continued)

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$Z_{.05}S$	$Z_{.01}S$	Results
BC (Continued)	A1	B4C1:B4C5	5.1756	12.4425	15.9580	B4C1=B4C5
		B4C1:B2C3	9.6512	12.6005	16.1555	B4C1=B2C3
		B4C1:B3C2	15.0591	12.7585	16.3530	B4C1<B3C2*
		B1C4:B1C5	1.9364	10.9415	14.3780	B1C4=B1C5
		B1C4:B4C4	1.9585	11.5340	15.0100	B1C4=B4C4
		B1C4:B2C1	2.4135	11.9290	15.4050	B1C4=B2C1
		B1C4:B4C5	4.6756	12.2055	15.7210	B1C4=B4C5
		B1C4:B2C3	8.2029	12.4425	15.9580	B1C4=B2C3
		B1C4:B3C2	13.6108	12.6005	16.1555	B1C4<B3C2*
		B1C5:B4C4	0.0847	10.9415	14.3780	B1C5=B4C4
		B1C5:B2C1	0.1200	11.5340	15.0100	B1C5=B2C1
		B1C5:B4C5	1.9117	11.9290	15.4050	B1C5=B4C5
		B1C5:B2C3	5.8052	12.2055	15.7210	B1C5=B2C3
		B1C5:B3C2	11.1157	12.4425	15.9580	B1C5=B3C2
		B4C4:B2C1	0.0353	10.9415	14.3780	B4C4=B2C1
		B4C4:B4C5	1.8931	11.5340	15.0100	B4C4=B4C5
		B4C4:B2C3	5.8254	11.9290	15.4050	B4C4=B2C3
		B4C4:B3C2	11.2333	12.2055	15.7210	B4C4=B3C2
		B2C1:B4C5	2.2214	10.9415	14.3780	B2C1=B4C5
		B2C1:B2C3	4.8929	11.5340	15.0100	B2C1=B2C3
		B2C1:B3C2	11.1973	11.9290	15.4050	B2C1=B3C2
		B4C5:B2C3	3.4638	10.9415	14.3780	B4C5=B2C3
		B4C5:B3C2	8.7743	11.5340	15.0100	B4C5=B3C2
		B2C3:B3C2	5.4079	10.9415	14.3780	B2C3=B3C2

* $P < .05$
** $P < .01$
*** $P < .001$

Table 130

Mean Positive Goal Discrepancy Scores:
Concept Formation Verbal Task

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	1.1364	4.0282	2.0920	3.5735
	B2	2.5632	1.9898	3.5552	1.3104
	B3	2.4368	3.2617	4.3588	1.0979
	B4	0.8952	3.3763	1.7528	3.2598
C	C1	1.3577	1.2473	1.5577	1.8585
	C2	1.3101	3.0937	2.8918	1.8571
	C3	2.1881	3.6690	3.4447	1.5611
	C4	2.1183	4.8024	4.4117	3.3983
	C5	1.8153	3.0076	2.3926	2.8770
D	D1	1.8938	2.9618	2.9911	2.2769
	D2	1.6220	3.3662	2.8883	2.3439
S	S1	1.6459	3.3971	3.0090	2.5805
	S2	1.8699	2.9309	2.8704	2.0403
BC	B1C1	0.0083	1.2188	0.7397	2.6744
	B1C2	1.2866	2.8329	1.0355	2.9328
	B1C3	0.7446	3.2503	2.3654	2.7678
	B1C4	1.8642	7.8952	4.3595	5.4505
	B1C5	1.7783	4.9443	1.9599	4.0420
	B2C1	1.4993	0.4692	1.9969	0.3783
	B2C2	1.6645	2.9679	3.6467	1.3786
	B2C3	4.9499	1.7576	4.0017	0.9377
	B2C4	3.0458	3.1596	4.7304	1.8941
	B2C5	1.6565	1.5947	3.4003	1.9633
	B3C1	2.2734	1.0007	2.4799	0.1807
	B3C2	1.8395	2.7153	4.1725	0.4228
	B3C3	2.4992	5.9499	5.8357	0.0448
	B3C4	2.7365	3.1974	6.1183	3.1289
	B3C5	2.8354	3.4452	3.1876	1.7123
	B4C1	1.6498	2.3005	1.0143	4.2006
	B4C2	0.4498	3.8587	2.7125	2.6942
	B4C3	0.5587	3.7182	1.5760	2.4941
	B4C4	0.8267	4.9574	2.4386	3.1197
	B4C5	0.9910	2.0467	1.0226	3.7904

Table 130 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
BD	B1D1	1.4110	3.2940	1.7595	3.1473
	B2D1	2.8875	2.1798	3.9931	0.7718
	B3D1	2.4701	2.7343	4.1352	1.5338
	B4D1	0.8066	3.6391	2.0766	3.6547
	B1D2	0.8618	4.7624	2.4245	3.9997
	B2D2	2.2389	1.7998	3.1173	1.8490
	B3D2	2.4035	3.7891	4.5824	0.6620
	B4D2	0.9838	3.1135	0.6560	2.8649
BS	B1S1	0.7050	3.8274	1.7993	3.1592
	B2S1	2.6390	1.9785	3.6708	1.9778
	B3S1	2.4352	2.9275	4.8113	1.7713
	B4S1	0.8044	4.8550	1.7546	3.4137
	B1S2	1.5678	4.2290	2.3847	3.9878
	B2S2	2.4874	2.0011	3.4396	0.6430
	B3S2	2.4384	3.5959	3.9063	0.4245
	B4S2	0.9860	1.8976	1.7510	3.1059
CD	C1D1	1.4078	1.3569	1.7862	2.2829
	C2D1	1.5500	3.1797	3.1036	1.6077
	C3D1	1.1364	2.8051	3.1639	1.4435
	C4D1	2.8266	4.7665	4.1196	3.3142
	C5D1	1.6878	2.7008	2.7822	2.7362
	C1D2	1.3076	1.1377	1.3292	1.4341
	C2D2	1.0702	3.0077	2.6800	2.1065
	C3D2	1.5190	4.5329	3.7255	1.6787
	C4D2	1.4100	4.8383	4.7038	3.4824
	C5D2	1.9428	3.3144	2.0025	3.0178
CS	C1S1	1.9081	1.2856	1.2310	1.8029
	C2S1	1.3441	3.5955	3.4956	2.3890
	C3S1	1.2940	4.4349	3.7155	1.6835
	C4S1	1.9131	4.3745	4.0626	3.4216
	C5S1	0.9098	3.1864	2.5403	3.6055
	C1S2	0.8073	1.2090	1.8844	1.9141
	C2S2	1.2761	2.5919	2.2880	1.3252
	C3S2	1.3614	2.9031	2.1639	1.4387
	C4S2	2.3235	5.2303	4.7608	3.3750
	C5S2	2.7208	2.8288	2.2449	2.1485

Table 130 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
DS	D1S1	1.6995	3.1671	3.1526	2.7241
	D2S1	1,4277	3.5715	3.0498	2.7911
	D1S2	2.0881	2.7565	2.8296	1.8297
	D2S2	1.8163	3.1609	2.7268	1.8967

Table 131

Results of Analyses of Covariance Among Mean Positive Goal Discrepancy Scores: Concept Formation Verbal Task

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	310	12.55	31.75	19.90	18.24
Regression	39	34.80	107.46	81.95	55.19
Error	271	9.35	20.86	10.97	12.92
B	3	6.35	32.94	5.25	13.57
C	4	10.34	97.99**	68.50***	37.17*
D	1	5.47	12.12	0.78	0.33
S	1	3.58	15.49	1.37	20.79
BC	12	12.64	28.67	8.26	8.18
BD	3	2.83	18.50	10.88	20.04
BS	3	3.61	14.19	6.95	19.43
CD	4	7.78	9.91	5.84	4.15
CS	4	15.61	12.24	9.87	6.70
DS	1	1.89	0.22	2.38	8.78
MA	1	0.01	3.70	0.01	19.45
CA	1	1.36	12.83	0.01	0.01
IQ	1	1.72	9.39	11.31	7.09

* $P < .05$
** $P < .01$
*** $P < .001$

Table 132

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Positive Goal Discrepancy Scores: Concept Formation Verbal Task

Variable	Level of Practice	Comparison	$\frac{(b_i - b_j) \times}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$z_{.05}S$	$z_{.01}S$	Results
C	A2	C1:C2	14.4208	13.3362	17.3554	C1<C2*
		C1:C3	18.7586	13.7929	17.8121	C1<C3**
		C1:C4	27.3071	14.1126	18.1775	C1<C4**
		C1:C5	13.6368	12.6511	16.6246	C1<C5*
		C2:C3	4.5664	12.6511	16.6246	C2=C3
		C2:C4	13.2356	13.3362	17.3554	C2=C4
		C2:C5	0.6819	12.6511	16.6246	C2=C5
		C3:C4	8.7792	12.6511	16.6246	C3=C4
		C3:C5	5.1643	13.3362	17.3554	C3=C5
		C4:C5	13.9010	13.7929	17.8121	C4>C5*
C	A3	C1:C2	10.4195	10.4271	13.7021	C1=C2
		C1:C3	14.6169	10.9918	14.3043	C1<C3**
		C1:C4	21.9222	11.6317	14.9819	C1<C4**
		C1:C5	14.9433	11.3682	14.6808	C1<C5**
		C2:C3	4.3889	10.4271	13.7021	C2=C3
		C2:C4	11.7735	11.3682	14.6808	C2<C4*
		C2:C5	4.7233	10.9918	14.3043	C2=C5
		C3:C4	7.4905	10.9918	14.3043	C3=C4
		C3:C5	0.3290	10.4271	13.7021	C3=C5
		C4:C5	7.1641	10.4271	13.7021	C4=C5
C	A4	C1:C2	0.0109	9.9443	13.0676	C1=C2
		C1:C3	2.3037	10.4828	13.6420	C1=C3
		C1:C4	11.0274	10.4828	13.6420	C1<C4*
		C1:C5	7.8893	9.9443	13.0676	C1=C5
		C2:C3	2.3494	9.9443	13.0676	C2=C3
		C2:C4	11.9381	10.8418	14.0010	C2<C4*
		C2:C5	8.0953	10.4828	13.6420	C2=C5
		C3:C4	14.2310	11.0931	14.2882	C3<C4*
		C3:C5	10.2774	10.8418	14.0010	C3=C5
		C4:C5	4.0380	9.9443	13.0676	C4=C5

* $P < .05$

** $P < .01$

Table 133

Mean Negative Goal Discrepancy Scores:
Concept Formation Verbal Task

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	-0.4354	-2.6148	-3.0137	-1.4682
	B2	-1.8541	-1.4170	-1.3691	-1.6764
	B3	-3.3319	-1.5127	-2.0329	-1.8015
	B4	+0.0774	-2.2179	-2.2459	-1.3655
C	C1	-1.3247	-2.1359	-2.2906	-1.9965
	C2	-2.1912	-1.6971	-1.7429	-1.4968
	C3	-0.8221	-1.9017	-2.4495	-1.4744
	C4	-1.1232	-2.2143	-2.9062	-1.5414
	C5	-1.4688	-1.7540	-1.4378	-1.3804
D	D1	-1.1560	-1.7572	-2.1921	-1.7182
	D2	-1.6160	-2.1240	-2.1387	-1.4376
S	S1	-1.2779	-2.3517	-2.6511	-1.9396
	S2	-1.4941	-1.5295	-1.6797	-1.2162
BC	B1C1	-0.3688	-2.7887	-3.2448	-1.8215
	B1C2	-0.7221	-2.5591	-3.0174	-1.3219
	B1C3	-0.0296	-2.2218	-2.7173	-0.6415
	B1C4	-0.2475	-2.4789	-3.0915	-1.8241
	B1C5	-0.8090	-3.0255	-2.9975	-1.7320
	B2C1	-3.3549	-2.4960	-2.7844	-3.0977
	B2C2	-1.5775	-0.5307	-0.5811	-0.8601
	B2C3	-1.3262	-0.2721	-0.6083	-1.4831
	B2C4	-1.0046	-2.0480	-1.9881	-1.8242
	B2C5	-2.0073	-1.7382	-0.8836	-1.1169
	B3C1	-2.7001	-1.3516	-1.3225	-1.9140
	B3C2	-7.3010	-1.5441	-1.1844	-2.4583
	B3C3	-2.6319	-2.4862	-2.9079	-2.6315
	B3C4	-2.2603	-1.6351	-4.3783	-1.1298
	B3C5	-1.7662	-0.5465	-0.3714	-0.8739
	B4C1	+1.1250	-1.9073	-1.8107	-1.1528
	B4C2	+0.8358	-2.1545	-2.1887	-1.3469
	B4C3	+0.6993	-2.6267	-3.5645	-1.1415
	B4C4	-0.9804	-2.6952	-2.1669	-1.3875
	B4C5	-1.2927	-1.7058	-1.4987	-1.7988

Table 133 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
BD	B1D1	-0.6115	-2.5343	-3.0606	-1.4640
	B2D1	-1.4594	-1.3650	-1.4978	-1.9500
	B3D1	-2.4653	-0.9597	-1.8273	-1.3999
	B4D1	-0.0878	-2.1698	-2.3827	-2.0589
	B1D2	-0.2593	-2.6953	-2.9668	-1.4724
	B2D2	-2.2488	-1.4690	-1.2404	-1.4028
	B3D2	-4.1985	-2.0657	-2.2385	-2.2031
	B4D2	+0.2426	-2.2660	-2.1091	-0.6721
BS	B1S1	-0.2620	-2.6439	-3.2091	-1.6379
	B2S1	-1.5279	-1.7075	-1.7723	-1.9435
	B3S1	-2.7558	-2.0747	-3.0120	-2.0148
	B4S1	-0.5659	-2.9807	-2.6110	-2.1622
	B1S2	-0.6088	-2.5857	-2.8183	-1.2985
	B2S2	-2.1803	-1.1265	-0.9659	-1.4093
	B3S2	-3.9080	-0.9507	-1.0538	-1.5882
	B4S2	+0.5901	-1.4551	-1.7198	-0.5688
CD	C1D1	-0.8506	-2.1923	-2.6266	-2.2277
	C2D1	-1.7350	-1.5266	-2.0340	-1.5266
	C3D1	-0.7050	-1.2042	-1.7673	-1.7453
	C4D1	-1.1026	-2.5718	-3.3835	-1.4713
	C5D1	-1.3868	-1.2911	-1.1491	-1.6201
	C1D2	-1.7988	-2.0795	-1.9546	-1.7653
	C2D2	-2.6474	-1.8676	-1.4518	-1.4670
	C3D2	-0.9392	-2.5992	-3.1317	-1.2035
	C4D2	-1.1439	-1.8568	-2.4289	-1.6115
	C5D2	-1.5508	-2.2169	-1.7265	-1.1407
CS	C1S1	-1.1304	-2.1808	-2.5096	-2.6431
	C2S1	-0.9942	-1.5610	-2.1310	-1.6901
	C3S1	-0.6263	-2.3996	-2.9056	-1.6270
	C4S1	-1.7823	-3.2249	-4.0343	-1.6845
	C5S1	-1.8563	-2.3922	-1.6750	-2.0533
	C1S2	-1.5190	-2.0910	-2.0716	-1.3499
	C2S2	-3.3882	-1.8332	-1.3548	-1.3035
	C3S2	-1.0179	-1.4038	-1.9934	-1.3218
	C4S2	-0.4641	-1.2037	-1.7781	-1.3983
	C5S2	-2.0725	-1.1158	-1.2006	-0.7075

Table 133 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
DS	D1S1	-1.1239	-0.6259	-2.6875	-2.1897
	D2S1	-1.5839	-0.9927	-2.6341	-1.9091
	D1S2	-1.1881	-2.8885	-1.6967	-1.2467
	D2S2	-1.6481	-3.2553	-1.6433	-0.9661

Table 134

Results of Analyses of Covariance Among Mean Negative Goal Discrepancy Scores: Concept Formation Verbal Task

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	310	14.10	15.78	19.58	9.79
Regression	39	37.64	41.33	57.21	27.09
Error	271	10.71	12.11	14.17	7.31
B	3	10.27	6.21	19.98	0.18
C	4	16.30*	3.12	20.26	3.45
D	1	15.68	9.96	0.21	5.83
S	1	3.33	48.19*	67.26*	37.29
BC	12	32.35***	7.65	14.08	7.47
BD	3	19.03	4.57	1.91	15.74
BS	3	19.82	7.26	8.57	6.03
CD	4	2.84	10.30	14.55	1.38
CS	4	30.67*	12.60	7.91	4.24
DS	1	1.61	0.01	0.01	3.37
MA	1	2.14	19.31	98.15**	21.89
CA	1	8.43	0.01	2.15	2.94
IQ	1	0.01	8.57	23.45	3.75

* $P < .05$
** $P < .01$
*** $P < .001$

Table 135

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Negative Goal Discrepancy Scores: Concept Formation Verbal Task

Variable	Level of Practice	Comparison	$\frac{(b_i-b_j) \times}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$Z_{.05}S$	$Z_{.01}S$	Results
S	A2	S1:S2	9.8321	9.6396	12.6672	S1<S2*
S	A3	S1:S2	11.6163	10.4152	13.6864	S1<S2*
S	A4	S1:S2	8.6506	7.4790	9.8280	S1<S2*
BC	A1	B3C2:C2C1	8.4762	9.0651	11.9123	B3C2=B2C1
		B3C2:B4C4	9.7544	9.5560	12.4359	B3C2<B4C4*
		B3C2:B4C5	9.7512	9.8833	12.7631	B3C2=B4C5
		B3C2:B1C5	14.9295	10.1123	13.0249	B3C2<B1C5**
		B3C2:B1C3	15.9051	10.3087	13.2213	B3C2<B1C3**
		B3C2:B1C4	16.3456	10.4396	13.3849	B3C1<B1C4**
		B3C2:B2C5	16.3693	10.5705	13.5486	B3C2<B2C5**
		B3C2:B2C3	16.5517	10.6687	13.6467	B3C2<B2C3**
		B3C2:B1C1	16.7702	10.7669	13.7449	B3C2<B1C1**
		B3C2:B4C3	17.0488	10.8487	13.8431	B3C2<B4C3**
		B3C2:B3C3	15.1229	10.9305	13.9413	B3C2<B3C3**
		B3C2:B1C2	16.4683	10.9959	14.0231	B3C2<B1C2**
		B3C2:B3C1	16.7008	11.0614	14.1049	B3C2<B3C1**
		B3C2:B2C4	19.4890	11.1105	14.1540	B3C2<B2C4**
		B3C2:B3C4	17.7663	11.1596	14.2031	B3C2<B3C4**
		B3C2:B4C1	21.9607	11.2087	14.2685	B3C2<B4C1**
		B3C2:B2C2	18.9873	11.2577	14.3340	B3C2<B2C2**
		B3C2:B4C2	20.6070	11.3068	14.3831	B3C2<B4C2**
		B3C2:B3C5	22.0537	11.3559	14.4322	B3C2<B3C5**
		B2C1:B4C4	1.2551	9.0651	11.9123	B2C1=B4C4
		B2C1:B4C5	1.4277	9.5560	12.4359	B2C1=B4C5
		B2C1:B1C5	6.6059	9.8833	12.7631	B2C1=B1C5
		B2C1:B1C3	7.4289	10.1123	13.0249	B2C1=B1C3
		B2C1:B1C4	7.8694	10.3087	13.2213	B2C1=B1C4
		B2C1:B2C5	6.6708	10.4396	13.3849	B2C1=B2C5
		B2C1:B2C3	6.8249	10.5705	13.5486	B2C1=B2C3

Table 134 (Continued)

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$Z_{.05}S$	$Z_{.01}S$	Results
BC	A1 (Continued)	B2C1:B1C1	6.8322	10.6687	13.6467	B2C1=B1C1
		B2C1:B4C3	8.5725	10.7669	13.7449	B2C1=B4C3
		B2C1:B3C3	8.9861	10.8487	13.8431	B2C1=B3C3
		B2C1:B1C2	11.0094	10.9305	13.9413	B2C1<B1C2*
		B2C1:B3C1	9.2957	10.9959	14.0231	B2C1=B3C1
		B2C1:B2C4	9.6095	11.0614	14.1049	B2C1=B2C4
		B2C1:B3C4	12.5452	11.1105	14.1540	B2C1<B3C4*
		B2C1:B4C1	11.1079	11.1596	14.2031	B2C1=B4C1
		B3C2:B4C2	20.6070	11.3068	14.3831	B3C2<B4C2**
		B3C2:B3C5	22.0537	11.3559	14.4322	B3C2<B3C5**
		B2C1:B4C4	1.2551	9.0651	11.9123	B2C1=B4C4
		B2C1:B4C5	1.4277	9.5560	12.4359	B2C1=B4C5
		B2C1:B1C5	6.6059	9.8833	12.7631	B2C1=B1C5
		B2C1:B1C3	7.4289	10.1123	13.0249	B2C1=B1C3
		B2C1:B1C4	7.8694	10.3087	13.2213	B2C1=B1C4
		B2C1:B2C5	6.6708	10.4396	13.3849	B2C1=B2C5
		B2C1:B2C3	6.8249	10.5705	13.5486	B2C1=B2C3
		B2C1:B1C1	6.8322	10.6687	13.6467	B2C1=B1C1
		B2C1:B4C3	8.5725	10.7669	13.7449	B2C1=B4C3
		B2C1:B3C3	8.9861	10.8487	13.8431	B2C1=B3C3
		B2C1:B1C2	11.0094	10.9305	13.9413	B2C1<B1C2*
		B2C1:B3C1	9.2957	10.9959	14.0231	B2C1=B3C1
		B2C1:B2C4	9.6095	11.0614	14.1049	B2C1=B2C4
		B2C1:B3C4	12.5452	11.1105	14.1540	B2C1<B3C4*
		B2C1:B4C1	11.1079	11.1596	14.2031	B2C1=B4C1
		B2C1:B2C2	11.8237	11.2087	14.2685	B2C1<B2C2*
		B2C1:B4C2	16.5397	11.2577	14.3340	B2C1<B4C2**
		B2C1:B3C5	16.6831	11.3068	14.3831	B2C1<B3C5**
		B4C4:B4C5	0.1447	9.0651	11.9123	B4C4=B4C5
		B4C4:B1C5	5.3507	9.5560	12.4359	B4C4=B1C5
		B4C4:B1C3	6.0400	9.8633	12.7631	B4C4=B1C3
		B4C4:B1C4	5.4295	10.1123	13.0249	B4C4=B1C4
		B4C4:B2C5	6.6149	10.3087	13.2213	B4C4=B2C5
		B4C4:B2C3	6.7972	10.4396	13.3849	B4C4=B2C3
		B4C4:B1C1	6.8895	10.5705	13.5486	B4C4=B1C1
		B4C4:B4C3	6.3172	10.6687	13.6467	B4C4=B4C3
		B4C4:B3C3	7.7080	10.7669	13.7449	B4C4=B3C3
		B4C4:B1C2	9.7313	10.8487	13.8431	B4C4=B1C2
		B4C4:B3C1	9.8262	10.9305	13.9413	B4C4=B3C1
		B4C4:B2C4	8.3134	10.9959	14.0231	B4C4=B2C4
		B4C4:B3C4	9.2813	11.0614	14.1049	B4C4=B3C4
		B4C4:B4C1	10.3161	11.1105	14.1540	B4C4=B4C1
		B4C4:B2C2	12.7119	11.1596	14.2031	B4C4<B2C2*
		B4C4:B4C2	12.8983	11.2087	14.2685	B4C4<B4C2*
		B4C4:B3C5	15.7109	11.2577	14.3340	B4C4<B3C5**
		B4C5:B1C5	4.2279	9.0651	11.9123	B4C5=B1C5
		B4C5:B1C3	5.8674	9.5560	12.4359	B4C5=B1C3

Table 134 (Continued)

Vari-able	Level of Practice	Compari-son	$\frac{(b_i-b_j)\ x}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$\bar{z}_{.05}S$	$\bar{z}_{.01}S$	Results
		B4C5:B1C4	6.4155	9.8833	12.7631	B4C5=B1C4
		B4C5:B2C5	5.3043	10.1123	13.0249	B4C5=B2C5
		B4C5:B2C3	6.5023	10.3087	13.2213	B4C5=B2C3
		B4C5:B1C1	6.7170	10.4396	13.3849	B4C5=B1C1
		B4C5:B4C3	6.0164	10.5705	13.5486	B4C5=B4C3
		B4C5:B3C3	7.5323	10.6687	13.6467	B4C5=B3C3
		B4C5:B1C2	9.5556	10.7669	13.7449	B4C5=B1C2
		B4C5:B3C1	9.6537	10.8487	13.8431	B4C5=B3C1
		B4C5:B2C4	9.9164	10.9305	13.9413	B4C5=B2C4
		B4C5:B3C4	10.8917	10.9959	14.0231	B4C5=B3C4
		B4C5:B4C1	10.1676	11.0614	14.1049	B4C5=B4C1
		B4C5:B2C2	12.3104	11.1105	14.1540	B4C5<B2C2*
		B4C5:B4C2	12.7498	11.1596	14.2031	B4C5<B4C2*
		B4C5:B3C5	12.7972	11.2087	14.2685	B4C5<B3C5*
		B1C5:B1C3	0.5782	9.0651	11.9123	B1C5=B1C3
		B1C5:B1C4	0.9654	9.5560	12.4359	B1C5=B1C4
		B1C5:B2C5	0.9605	9.8833	12.7631	B1C5=B2C5
		B1C5:B2C3	1.3241	10.1123	13.0249	B1C5=B2C3
		B1C5:B1C1	1.2908	10.3087	13.2213	B1C5=B1C1
		B1C5:B4C3	1.8123	10.4396	13.3849	B1C5=B4C3
		B1C5:B3C3	2.2184	10.5705	13.5486	B1C5=B3C3
		B1C5:B1C2	3.6193	10.6687	13.6467	B1C5=B1C2
		B1C5:B3C1	4.4754	10.7669	13.7449	B1C5=B3C1
		B1C5:B2C4	4.5596	10.8487	13.8431	B1C5=B2C4
BC	A1	B1C5:B3C4	5.7134	10.9305	13.9413	B1C5=B3C4
(Continued)		B1C5:B4C1	6.6357	10.9959	14.0231	B1C5=B4C1
		B1C5:B2C2	7.1322	11.0614	14.1049	B1C5=B2C2
		B1C5:B4C2	9.6360	11.1105	14.1540	B1C5=B4C2
		B1C5:B3C5	8.2278	11.1596	14.2031	B1C5=B3C5
		B1C3:B1C4	0.3723	9.0651	11.9123	B1C3=B1C4
		B1C3:B2C5	0.4642	9.5560	12.4359	B1C3=B2C5
		B1C3:B2C3	0.5326	9.8833	12.7631	B1C3=B2C3
		B1C3:B1C1	0.7311	10.1123	13.0249	B1C3=B1C1
		B1C3:B4C3	0.9421	10.3081	13.2213	B1C3=B4C3
		B1C3:B3C3	1.2828	10.4396	13.3849	B1C3=B3C3
		B1C3:B1C2	3.1009	10.5705	13.5486	B1C3=B1C2
		B1C3:B3C1	3.7862	10.6687	13.6467	B1C3=B3C1
		B1C3:B2C4	3.9413	10.7669	13.7449	B1C3=B2C4
		B1C3:B3C4	5.0242	10.8487	13.8431	B1C3=B3C4
		B1C3:B4C1	5.9465	10.9305	13.9413	B1C3=B4C1
		B1C3:B2C2	6.5611	10.9959	14.0231	B1C3=B2C2
		B1C3:B4C2	8.9468	11.0614	14.1049	B1C3=B4C2
		B1C3:B3C5	9.5602	11.1105	14.1540	B1C3=B3C5
		B1C4:B2C5	0.0237	9.0651	11.9123	B1C4=B2C5
		B1C4:B2C3	0.2061	9.5560	12.4359	B1C4=B2C3
		B1C4:B1C1	0.3589	9.8833	12.7631	B1C4=B1C1
		B1C4:B4C3	0.7032	10.1123	13.0249	B1C4=B4C3
		B1C4:B3C3	1.1168	10.3087	13.2213	B1C4=B3C3

Table 134 (Continued)

Variable	Level of Practice	Comparison	$\frac{(b_i-b_j) \times}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$z_{.05}S$	$z_{.01}S$	Results
BC	A1 (Continued)	B1C4:B1C2	2.7194	10.4396	13.3849	B1C4=B1C2
		B1C4:B3C1	3.4152	10.5705	13.5486	B1C4=B3C1
		B1C4:B2C4	2.9587	10.6687	13.6467	B1C4=B2C4
		B1C4:B3C4	3.8518	10.7669	13.7449	B1C4=B3C4
		B1C4:B4C1	5.6151	10.8487	13.8431	B1C4=B4C1
		B1C4:B2C2	6.1207	10.9305	13.9413	B1C4=B2C2
		B1C4:B4C2	8.6704	10.9959	14.0231	B1C4=B4C2
		B1C4:B3C5	9.1197	11.0614	14.1049	B1C4=B3C5
		B2C5:B2C3	0.1579	9.0651	11.9123	B2C5=B2C3
		B2C5:B1C1	0.4009	9.5560	12.4359	B2C5=B1C1
		B2C5:B4C3	0.6795	9.8833	12.7631	B2C5=B4C3
		B2C5:B3C3	1.0931	10.1123	13.0249	B2C5=B3C3
		B2C5:B1C2	3.1164	10.3087	13.2213	B2C5=B1C2
		B2C5:B3C1	3.3915	10.4396	13.3849	B2C5=B3C1
		B2C5:B2C4	3.0113	10.5705	13.5486	B2C5=B2C4
		B2C5:B3C4	4.6522	10.6687	13.6467	B2C5=B3C4
		B2C5:B4C1	5.5914	10.7669	13.7449	B2C5=B4C1
		B2C5:B2C2	5.2802	10.8487	13.8431	B2C5=B2C2
		B2C5:B4C2	8.6467	10.9305	13.9413	B2C5=B4C2
		B2C5:B3C5	7.4929	10.9959	14.0231	B2C5=B3C5
		B2C3:B1C1	0.2186	9.0651	11.9123	B2C3=B1C1
		B2C3:B4C3	0.4202	9.5560	12.4359	B2C3=B4C3
		B2C3:B3C3	0.7697	9.8833	12.7631	B2C3=B3C3
		B2C3:B1C2	2.9340	10.1123	13.0249	B2C3=B1C2
		B2C3:B3C1	3.2091	10.3087	13.2213	B2C3=B3C1
		B2C3:B2C4	2.8534	10.4396	13.3849	B2C3=B2C4
		B2C3:B3C4	4.4698	10.5705	13.5486	B2C3=B3C4
		B2C3:B4C1	5.4090	10.6687	13.6467	B2C3=B4C1
		B2C3:B2C2	5.1222	10.7669	13.7449	B2C3=B2C2
		B2C3:B4C2	8.4643	10.8487	13.8431	B2C3=B4C2
		B2C3:B3C5	8.9136	10.9305	13.9413	B2C3=B3C5
		B1C1:B4C3	0.2785	9.0651	11.9123	B1C1=B4C3
		B1C1:B3C3	0.6921	9.5560	12.4359	B1C1=B3C3
		B1C1:B1C2	2.2949	9.8833	12.7631	B1C1=B1C2
		B1C1:B3C1	2.4635	10.1123	13.0249	B1C1=B3C1
		B1C1:B2C4	3.0762	10.3087	13.2213	B1C1=B2C4
		B1C1:B3C4	4.1747	10.4396	13.3849	B1C1=B3C4
		B1C1:B4C1	4.1616	10.5705	13.5486	B1C1=B4C1
		B1C1:B2C2	5.6960	10.6687	13.6467	B1C1=B2C2
		B1C1:B4C2	8.0972	10.7669	13.7449	B1C1=B4C2
		B1C1:B3C5	8.5384	10.8487	13.8431	B1C1=B3C5
		B4C3:B3C3	0.3495	9.0651	11.9123	B4C3=B3C3
		B4C3:B1C2	2.4369	9.5560	12.4359	B4C3=B1C2
		B4C3:B3C1	2.7120	9.8833	12.7631	B4C3=B3C1
		B4C3:B2C4	2.7977	10.1123	13.0249	B4C3=B2C4
		B4C3:B3C4	3.9727	10.3087	13.2213	B4C3=B3C4
		B4C3:B4C1	4.1513	10.4396	13.3849	B4C3=B4C1
		B4C3:B2C2	5.5134	10.5705	13.5486	B4C3=B2C2
		B4C3:B4C2	6.8998	10.6687	13.6467	B4C3=B4C2

Table 134 (Continued)

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$Z_{.05}S$	$Z_{.01}S$	Results
BC	A1 (Continued)	B4C3:B3C5	8.4165	10.7669	13.7449	B4C3=B3C5
		B3C3:B1C2	2.0233	9.0651	11.9123	B3C3=B1C2
		B3C3:B3C1	1.9425	9.5560	12.4359	B3C3=B3C1
		B3C3:B2C4	2.3841	9.8833	12.7631	B3C3=B2C4
		B3C3:B3C4	3.0823	10.1123	13.0249	B3C3=B3C4
		B3C3:B4C1	4.4983	10.3087	13.2213	B3C3=B4C1
		B3C3:B2C2	5.0039	10.4396	13.3849	B3C3=B2C2
		B3C3:B4C2	7.5536	10.5705	13.5486	B3C3=B4C2
		B3C3:B3C5	6.9308	10.6687	13.6467	B3C3=B3C5
		B1C2:B3C1	0.2702	9.0651	11.9123	B1C2=B3C1
		B1C2:B2C4	0.3608	9.5560	12.4359	B1C2=B2C4
		B1C2:B3C4	1.5358	9.8833	12.7631	B1C2=B3C4
		B1C2:B4C1	2.4750	10.1123	13.0249	B1C2=B4C1
		B1C2:B2C2	2.5190	10.3087	13.2213	B1C2=B2C2
		B1C2:B4C2	4.5556	10.4396	13.3849	B1C2=B4C2
		B1C2:B3C5	5.9796	10.5705	13.5486	B1C2=B3C5
		B3C1:B2C4	0.0857	9.0651	11.9123	B3C1=B2C4
		B3C1:B3C4	1.0655	9.5560	12.4359	B3C1=B3C4
		B3C1:B4C1	1.8122	9.8833	12.7631	B3C1=B4C1
		B3C1:B2C2	2.7055	10.1123	13.0249	B3C1=B2C2
		B3C1:B4C2	5.2552	10.3087	13.2213	B3C1=B4C2
		B3C1:B3C5	4.8211	10.4396	13.3849	B3C1=B3C5
		B2C4:B3C4	0.9679	9.0651	11.9123	B2C4=B3C4
		B2C4:B4C1	2.0761	9.5560	12.4359	B2C4=B4C1
		B2C4:B2C2	2.2688	9.8833	12.7631	B2C4=B2C2
		B2C4:B4C2	5.1695	10.1123	13.0249	B2C4=B4C2
		B2C4:B3C5	5.6188	10.3087	13.2213	B2C4=B3C5
		B3C4:B4C1	0.9223	9.0651	11.9123	B3C4=B4C1
		B3C4:B2C2	1.4448	9.5560	12.4359	B3C4=B2C2
		B3C4:B4C2	3.9945	9.8833	12.7631	B3C4=B4C2
		B3C4:B3C5	3.7557	10.1123	13.0249	B3C4=B3C5
		B4C1:B2C2	0.5056	9.0651	11.9123	B4C1=B2C2
		B4C1:B4C2	2.5822	9.5560	12.4359	B4C1=B4C2
		B4C1:B3C5	3.5046	9.8833	12.7631	B4C1=B3C5
		B2C2:B4C2	2.1003	9.0651	11.9123	B2C2=B4C2
		B2C2:B3C5	2.9990	9.5560	12.4359	B2C2=B3C5
		B4C2:B3C5	0.4412	9.0651	11.9123	B4C2=B3C5

Table 134 (Continued)

Variable	Level of Practice	Comparison	$\frac{(b_i-b_j)\times}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$Z_{.05}^{S}$	$Z_{.01}^{S}$	Results
CS	A1	C2S2:C4S1	3.1684	9.0651	11.9123	C2S2=C4S1
		C2S2:C5S1	5.8734	9.5560	12.4359	C2S2=C5S1
		C2S2:C3S2	7.8196	9.8833	12.7631	C2S2=C3S2
		C2S2:C1S2	7.7018	10.1123	13.0249	C2S2=C1S2
		C2S2:C1S1	11.6329	10.3087	13.2213	C2S2<C1S1*
		C2S2:C3S1	11.7071	10.4396	13.3849	C2S2<C3S1*
		C2S2:C5S2	12.1707	10.5705	13.5486	C2S2<C5S2*
		C2S2:C4S2	14.3774	10.6687	13.6467	C2S2<C4S2**
		C2S2:C2S1	13.4248	10.7669	13.7449	C2S2<C2S1*
		C4S1:C5S1	2.0505	9.0651	11.9123	C4S1=C5S1
		C4S1:C3S2	6.6923	9.5560	12.4359	C4S1=C3S2
		C4S1:C1S2	6.6724	9.8833	12.7631	C4S1=C1S2
		C4S1:C1S1	6.4430	10.1123	13.0249	C4S1=C1S1
		C4S1:C3S1	6.5107	10.3087	13.2213	C4S1=C3S1
		C4S1:C5S2	12.5011	10.4396	13.3849	C4S1<C5S2*
		C4S1:C4S2	9.2064	10.5705	13.5486	C4S1=C4S2
		C4S1:C2S1	14.3774	10.6687	13.6467	C4S1<C2S1**
		C5S1:C3S2	4.0174	9.0651	11.9123	C5S1=C3S2
		C5S1:C1S2	4.0113	9.5560	12.4359	C5S1=C1S2
		C5S1:C1S1	4.3925	9.8833	12.7631	C5S1=C1S1
		C5S1:C3S1	4.4423	10.1123	13.0249	C5S1=C3S1
		C5S1:C5S2	5.9472	10.3087	13.2213	C5S1=C5S2
		C5S1:C4S2	12.5011	10.4396	13.3849	C5S1<C4S2*
		C5S1:C2S1	12.1707	10.5705	13.5486	C5S1<C2S1*
		C3S2:C1S2	0.0114	9.0651	11.9123	C3S2=C1S2
		C3S2:C1S1	1.7127	9.5560	12.4359	C3S2=C1S1
		C3S2:C3S1	1.0669	9.8833	12.7631	C3S2=C3S1
		C3S2:C5S2	4.4423	10.1123	13.0249	C3S2=C5S2
		C3S2:C4S2	6.5107	10.3087	13.2213	C3S2=C4S2
		C3S2:C2S1	11.7071	10.4396	13.3849	C3S2<C2S1*
		C1S2:C1S1	1.0199	9.0651	11.9123	C1S2=C1S1
		C1S2:C3S1	1.7127	9.5560	12.4359	C1S2=C3S1
		C1S2:C5S2	4.3925	9.8833	12.7631	C1S2=C5S2
		C1S2:C4S2	6.4430	10.1123	13.0249	C1S2=C4S2
		C1S2:C2S1	11.6329	10.3087	13.2213	C1S2<C2S1*
		C1S1:C3S1	0.0114	9.0651	11.9123	C1S1=C3S1
		C1S1:C5S2	4.0113	9.5560	12.4359	C1S1=C5S2
		C1S1:C4S2	6.6724	9.8833	12.7631	C1S1=C4S2
		C1S1:C2S1	7.7018	10.1123	13.0249	C1S1=C2S1
		C3S1:C5S2	4.0174	9.0651	11.9123	C3S1=C5S2
		C3S1:C4S2	6.6923	9.5560	12.4359	C3S1=C4S2
		C3S1:C2S1	7.8196	9.8833	12.7631	C3S1=C2S1
		C5S2:C4S2	2.0505	9.0651	11.9123	C5S2=C4S2
		C5S2:C2S1	5.8734	9.5560	12.4359	C5S2=C2S1
		C4S2:C2S1	3.1684	9.0651	11.9123	C4S2=C2S1

* $P < .05$
**$P < .01$

TABLE 136

COMPARISON OF THE GROUPS IN TERMS OF DIRECTIONS OF GOAL CHANGE AFTER SUCCESS AND FAILURE: CONCEPT FORMATION VERBAL TASK (FREQUENCIES)

Comparison	Trial 9				Trial 10				Trial 17				Trial 18			
	Direction				Direction				Direction				Direction			
	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T
B1D1C1	8	0	0	8	7	0	1	8	8	0	0	8	8	0	0	8
B1D1C2	7	0	1	8	7	0	1	8	7	0	1	8	7	0	1	8
B1D1C5	6	0	1	7	2	0	0	2	2	0	0	2	2	0	1	3
B1D2C1	8	0	0	8	7	1	0	8	6	2	0	8	8	0	0	8
B1D2C2	8	0	0	8	7	0	1	8	7	0	1	8	8	0	0	8
B1D2C5	4	1	0	5	3	0	0	3	2	0	2	4	2	1	2	5
B2D1C1	7	0	1	8	8	0	0	8	7	0	1	8	7	1	0	8
B2D1C2	8	0	0	8	8	0	0	8	8	0	0	8	6	0	2	8
B2D1C5	4	1	1	6	3	1	2	6	4	0	2	6	1	0	1	2
B2D2C1	7	0	1	8	6	1	1	8	7	0	1	8	7	0	1	8
B2D2C2	7	0	1	8	8	0	0	8	7	0	1	8	8	0	0	8
B2D2C5	6	0	0	6	5	1	1	7	3	0	1	4	1	1	2	4
B3D1C1	7	0	1	8	8	0	0	8	7	0	1	8	6	1	1	8
B3D1C2	6	0	2	8	8	0	0	8	7	0	1	8	7	0	1	8
B3D1C5	5	0	2	7	2	3	1	6	0	0	1	1	2	1	3	6
B3D2C1	7	0	1	8	8	0	0	8	7	1	0	8	8	0	0	8
B3D2C2	6	1	1	8	6	1	1	8	7	1	0	8	6	0	2	8
B3D2C5	2	0	1	3	5	0	0	5	3	1	0	4	3	1	1	5
B4D1C1	6	0	2	8	7	0	1	8	8	0	0	8	7	0	1	8
B4D1C2	8	0	0	8	8	0	0	8	7	1	0	8	7	0	1	8
B4D1C5	4	1	0	5	4	0	0	4	3	0	0	3	2	0	0	2
B4D2C1	6	0	2	8	7	1	0	8	6	0	2	8	8	0	0	8
B4D2C2	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B4D2C5	3	0	1	4	5	0	0	5	4	0	0	4	6	0	0	6
	Trial 9				Trial 10				Trial 17				Trial 18			
	Direction				Direction				Direction				Direction			
	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T
B1D1C3	1	6	1	8	1	6	1	8	2	5	1	8	1	5	2	8
B1D1C4	0	7	1	8	2	5	1	8	2	5	1	8	2	5	1	8
B1D1C5	0	0	1	1	0	5	1	6	1	2	3	6	0	4	1	5
B1D2C3	0	6	2	8	2	4	2	8	0	6	2	8	0	6	2	8
B1D2C4	1	4	3	8	0	7	1	8	2	5	1	8	1	6	1	8
B1D2C5	0	1	2	3	0	4	1	5	0	2	2	4	0	1	2	3
B2D1C3	0	8	0	8	0	8	0	8	1	7	0	8	1	7	0	8
B2D1C4	1	3	4	8	1	5	2	8	2	2[a]	4	8	1	4	3	8
B2D1C5	0	2	0	2	1	0	1	2	0	2	1	3	2	2	2	6
B2D2C3	0	6	2	8	0	6	2	8	0	6	2	8	1	5	2	8
B2D2C4	1	5	2	8	0	6	2	8	1	5	2	8	0	5	3	8
B2D2C5	0	2	0	2	0	1	0	1	1	3	0	4	0	4	0	4

TABLE 136 (Continued)

Comparison	Trial 9				Trial 10				Trial 17				Trial 18			
	Direction				Direction				Direction				Direction			
	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T
B3D1C3	0	6	2	8	1	5	2	8	0	5	3	8	1	5	2	8
B3D1C4	1	6	1	8	1	6	1	8	0	7	1	8	0	7	1	8
B3D1C5	0	0	1	1	0	1	1	2	0	3	4	7	0	2	0	2
B3D2C3	0	7	1	8	0	6	2	8	0	5	3	8	0	7	1	8
B3D2C4	1	7	0	8	0	6	2	8	0	6	2	8	1	5	2	8
B3D2C5	0	4	1	5	0	2	1	3	0	2	2	4	1	0	2	3
B4D1C3	1	7	0	8	0	7	1	8	0	8[a]	0	8	0	8	0	8
B4D1C4	2	6	0	8	1	7	0	8	2	5	1	8	1	7	0	8
B4D1C5	0	3	0	3	1	2	1	4	1	3	1	5	0	5	1	6
B4D2C3	3	3	2	8	1	7	0	8	1	6	1	8	2	5	1	8
B4D2C4	1	7	0	8	0	8	0	8	0	7	1	8	0	8	0	8
B4D2C5	0	3	1	4	0	1	2	3	0	3	1	4	0	2	0	2
	Trial 11				Trial 14				Trial 15				Trial 19			
	Direction				Direction				Direction				Direction			
	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T
B1D1C1	8	0	0	8	8	0	0	8	7	1	0	8	8	0	0	8
B1D1C2	7	0	1	8	7	1	0	8	6	1	1	8	4	2	2	8
B1D1C3	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B1D1C5	3	0	0	3	4	0	0	4	3	0	0	3	4	0	0	4
B1D2C1	8	0	0	8	8	0	0	8	8	0	0	8	7	1	0	8
B1D2C2	8	0	0	8	8	0	0	8	7	0	1	8	8	0	0	8
B1D2C3	7	0	1	8	6	1	1	8	7	0	1	8	6	0	2	8
B1D2C5	0	1	1	2	4	0	1	5	1	0	1	2	2	1	2	5
B2D1C1	8	0	0	8	7	0	1	8	8	0	0	8	7	0	1	8
B2D1C2	8	0	0	8	8	0	0	8	7	0	1	8	7	0	1	8
B2D1C3	8	0	0	8	6	1	1	8	7	1	0	8	6	1	1	8
B2D1C5	2	0	1	3	4	0	2	6	3	1	2	6	2	0	0	2
B2D2C1	7	1	0	8	7	0	1	8	6	0	2	8	6	0	2	8
B2D2C2	8	0	0	8	7	0	1	8	8	0	0	8	8	0	0	8
B2D2C3	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B2D2C5	4	0	1	5	4	0	1	5	3	0	0	3	2	0	1	3
B3D1C1	7	0	1	8	8	0	0	8	8	0	0	8	8	0	0	8
B3D1C2	5	2	1	8	5	0	3	8	8	0	0	8	6	0	2	8
B3D1C3	7	0	1	8	8	0	0	8	8	0	0	8	7	0	1	8
B3D1C5	3	0	3	6	2	0	4	6	4	0	1	5	2	1	2	5
B3D2C1	6	1	1	8	7	1	0	8	8	0	0	8	8	0	0	8
B3D2C2	6	1	1	8	6	1	1	8	7	0	1	8	6	1	1	8
B3D2C3	8	0	0	8	8	0	0	8	7	0	1	8	6	1	1	8
B3D2C5	2	1	1	4	3	0	1	4	3	0	0	3	3	0	0	3
B4D1C1	7	0	1	8	7	0	1	8	8	0	0	8	8	0	0	8
B4D1C2	7	1	0	8	8	0	0	8	6	2	0	8	6	0	2	8
B4D1C3	7	0	1	8	8	0	0	8	7	1	0	8	8	0	0	8
B4D1C5	4	0	0	4	6	0	0	6	2	0	0	2	3	0	0	3
B4D2C1	6	1	1	8	8	0	0	8	7	0	1	8	7	0	1	8
B4D2C2	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B4D2C3	6	1	1	8	6	1	1	8	7	1	0	8	5	1	2	8
B4D2C5	4	0	0	4	3	0	0	3	3	0	0	3	2	0	0	2

TABLE 136 (Continued)

Comparison	Trial 12				Trial 13				Trial 16				Trial 20			
	Direction				Direction				Direction				Direction			
	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T
B1D1C2	0	5	3	8	0	5	3	8	1	6	1	8	1	5	2	8
B1D1C3	0	6	2	8	2	6	0	8	0	6	2	8	1	5	2	8
B1D1C4	2	5	1	8	2	4	2	8	1	5	2	8	0	6	2	8
B1D1C5	0	2	3	5	0	4	1	5	0	1	1	2	0	1	1	2
B1D2C2	0	7	1	8	0	8[b]	0	8	0	7	1	8	0	6	2	8
B1D2C3	0	6	2	8	0	6	2	8	0	6	2	8	0	5	3	8
B1D2C4	0	7	1	8	1	6	1	8	0	8	0	8	1	7	0	8
B1D2C5	0	3	1	4	0	2	1	3	0	2	1	3	1	0	1	2
B2D1C2	1	6	1	8	0	4	4	8	0	4	4	8	0	6	2	8
B2D1C3	1	7	0	8	0	7	1	8	2	6	0	8	1	7	0	8
B2D1C4	1	3	4	8	2	1[b]	5	8	2	3	3	8	1	4	3	8
B2D1C5	0	3	2	5	0	2	1	3	1	2	1	4	2	2	1	5
B2D2C2	0	6	2	8	0	5	3	8	0	5	3	8	0	4	4	8
B2D2C3	0	7	1	8	0	6	2	8	1	6	1	8	0	6	2	8
B2D2C4	0	8	0	8	0	7	1	8	0	7	1	8	0	5	3	8
B2D2C5	0	2	0	2	0	2	1	3	0	0	1	1	0	1	1	2
B3D1C2	0	7	1	8	0	8[b]	0	8	1	6	1	8	1	6	1	8
B3D1C3	0	7	1	8	0	6	2	8	1	6	1	8	0	6	2	8
B3D1C4	1	7	0	8	0	8[b]	0	8	1	7	0	8	1	5	2	8
B3D1C5	0	4	0	4	0	2	1	3	0	1	1	2	0	2	0	2
B3D2C2	1	7	0	8	2	6	0	8	1	7	0	8	1	6	1	8
B3D2C3	0	7	1	8	0	6	2	8	0	8	0	8	0	8	0	8
B3D2C4	0	6	2	8	1	4	3	8	0	5	3	8	0	5	3	8
B3D2C5	2	2	1	5	0	4	1	5	2	1	0	3	1	3	0	4
B4D1C2	0	7	1	8	1	5	2	8	1	6	1	8	0	6	2	8
B4D1C3	0	6	2	8	0	7	1	8	0	8	0	8	0	8	0	8
B4D1C4	2	6	0	8	1	6	1	8	3	5	0	8	1	7	0	8
B4D1C5	0	5	1	6	1	3	0	4	0	2	1	3	2	1	3	6
B4D2C2	1	7	0	8	0	8[b]	0	8	1	7	0	8	0	8	0	8
B4D2C3	2	4	2	8	2	6	0	8	1	7	0	8	0	6	2	8
B4D2C4	1	7	0	8	0	7	1	8	0	8	0	8	1	7	0	8
B4D2C5	1	4	0	5	0	4	2	6	1	0	1	2	0	3	0	3

TABLE 136 (Continued)

Comparison	Trial 21				Trial 22				Trial 23			
	Direction				Direction				Direction			
	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T
B1D1C1	8	0	0	8	8	0	0	8	8	0	0	8
B1D1C2	6	0	2	8	7	0	1	8	7	0	1	8
B1D1C3	7	0	1	8	7	0	1	8	7	1	0	8
B1D1C4	8	0	0	8	8	0	0	8	8	0	0	8
B1D1C5	2	0	1	3	1	0	0	1	5	0	0	5
B1D2C1	8	0	0	8	8	0	0	8	8	0	0	8
B1D2C2	8	0	0	8	7	0	1	8	8	0	0	8
B1D2C3	8	0	0	8	8	0	0	8	8	0	0	8
B1D2C4	7	0	1	8	8	0	0	8	7	1	0	8
B1D2C5	4	0	1	5	2	2	1	5	2	0	2	4
B2D1C1	4	0	4	8	7	0	1	8	7	1	0	8
B2D1C2	8	0	0	8	7	1	0	8	7	0	1	8
B2D1C3	7	1	0	8	6	1	1	8	8	0	0	8
B2D1C4	6	0	2	8	7	0	1	8	7	0	1	8
B2D1C5	3	0	2	5	2	0	0	2	2	0	3	5
B2D2C1	7	0	1	8	6	0	2	8	8	0	0	8
B2D2C2	8	0	0	8	8	0	0	8	8	0	0	8
B2D2C3	7	0	1	8	8	0	0	8	8	0	0	8
B2D2C4	6	0	2	8	6	0	2	8	7	0	1	8
B2D2C5	3	1	2	6	3	1	1	5	3	1	1	5
B3D1C1	8	0	0	8	8	0	0	8	8	0	0	8
B3D1C2	6	1	1	8	7	0	1	8	7	0	1	8
B3D1C3	7	0	1	8	6	0	2	8	7	0	1	8
B3D1C4	8	0	0	8	8	0	0	8	8	0	0	8
B3D1C5	4	0	2	6	3	0	1	4	1	1	3	5
B3D2C1	8	0	0	8	7	1	0	8	8	0	0	8
B3D2C2	4	1	3	8	6	2	0	8	7	0	1	8
B3D2C3	6	1	1	8	7	1	0	8	7	1	0	8
B3D2C4	6	0	2	8	7	0	1	8	8	0	0	8
B3D2C5	2	0	1	3	1	1	0	2	3	0	0	3
B4D1C1	8	0	0	8	8	0	0	8	7	0	1	8
B4D1C2	7	0	1	8	7	0	1	8	7	0	1	8
B4D1C3	7	1	0	8	7	1	0	8	7	1	0	8
B4D1C4	6	1	1	8	7	0	1	8	8	0	0	8
B4D1C5	6	0	1	7	6	0	0	6	6	1	0	7
B4D2C1	7	0	1	8	6	0	2	8	7	0	1	8
B4D2C2	8	0	0	8	8	0	0	8	8	0	0	8
B4D2C3	8	0	0	8	7	0	1	8	8	0	0	8
B4D2C4	8	0	0	8	8	0	0	8	8	0	0	8
B4D2C5	5	0	0	5	6	0	0	6	7	0	0	7

[a] Trial 17, FL: B2D1C4 < B4D1C3.

[b] Trial 13, FL: B2D1C4 < B1D2C2, B3D1C2, B3D1C4, and B4D2C2..

Table 137

Mean Attainment Time Scores: Concept Formation
Non-Verbal Task--Comparisons Over All B Groups

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	122.8804	92.8452	80.9054	77.9737
	B2	96.0052	78.0445	69.8340	67.8486
	B3	104.8410	79.0738	70.5197	70.1045
	B4	134.8782	94.3467	80.4064	75.9623
C	C1	117.0630	87.0267	75.3440	73.3032
	C2	113.9818	85.4711	75.6030	72.2550
	C3	113.5005	85.8195	72.5047	69.2121
	C4	112.7655	87.2792	77.8657	73.7310
	C5	123.4521	86.0282	75.3512	75.2347
	C6	107.1443	84.8405	75.8297	74.0977
D	D1	117.0930	86.6515	76.1621	72.7852
	D2	112.2094	85.5036	74.6706	73.1593

Table 138

Results of Analyses of Covariance Among Mean Attainment Time Scores:
Concept Formation Non-Verbal Task--Comparisons Over All B Groups

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	372	1,406.8108	857.5690	833.3729	915.3291
Regression	12	5,593.8965	4,020.7380	6,394.0348	6,940.0889
Error	360	1,267.2412	752.1300	650.0 42	714.5037
B	3	5,669.2880**	834.1817	461.5597	548.0237
C	5	1,771.9112	53.0020	181.5434	267.6052
D	1	2,208.2926	122.0037	205.9667	12.9555
MA	1	6,362.3000*	7,239.1000**	11,438.3000***	9,868.2000**
CA	1	2,883.6000	336.2000	0.0400	5.6000
IQ	1	11.9412	1,503.8823	3,853.0000*	3,205.2353*

* P < .05
** P < .01
*** P < .001

Table 139

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Attainment Time Scores: Concept Formation Non-Verbal Task--Comparisons Over All B Groups

Variable	Level of Practice	Comparison	$(b_i-b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$z_{.05}S$	$z_{.01}S$	Results
B	A1	B1:B2	104.0877	103.9520	135.2800	B1>B2*
		B1:B3	47.7286	98.6120	129.5840	B1=B3
		B1:B4	105.2805	98.6120	129.5840	B1<B4*
		B2:B3	45.9127	98.6120	129.5840	B2=B3
		B2:B4	134.6599	107.5120	138.8400	B2<B4*
		B3:B4	73.5760	103.9520	135.2800	B3=B4

* $P < .05$

Table 140

Mean Attainment Time Scores: Concept Formation Non-Verbal Task--Comparisons Within the B1 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	105.9624	76.6103	62.9716	60.5999
	C2	105.6479	77.7884	65.6269	59.3652
	C3	98.3121	78.6506	66.4043	65.3682
	C4	107.9477	80.5054	69.6347	64.6709
	C5	141.1796	85.4218	67.1113	69.5771
	C6	114.7886	79.7637	65.1846	62.3610
D	D1	112.0364	77.2905	62.4790	58.2231
	D2	112.5763	82.2896	69.8322	69.0910

Table 141

Results of Analyses of Covariance Among Mean Attainment Time Scores: Concept Formation Non-Verbal Task--Comparisons Within the B1 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	90	1,155.5470	505.1138	406.0307	588.6272
Regression	9	2,333.7695	274.0411	280.4807	518.1164
Error	81	1,024.6333	530.7855	419.9807	596.4618
C	5	3,211.8937*	135.5674	70.9233	200.3394
D	1	6.5767	563.8809	1,219.9612	2,665.0045*
MA	1	153.3345	6.6584	67.9893	19.0782
CA	1	116.0339	63.1186	0.0002	142.2203
IQ	1	19.6155	6.9465	22.4642	96.5620

* $P < .05$
** $P < .01$

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Table 142

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Attainment Time Scores: Concept Formation Non-Verbal Task--Comparisons Within the B1 Group

Variable	Level of Practice	Comparison	$(b_i - b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$Z_{.05}S$	$Z_{.01}S$	Results
C	A1	C1:C2	1.2182	88.6677	116.5164	C1=C2
		C1:C3	29.6297	93.4692	121.6380	C1=C3
		C1:C4	7.4283	88.6677	116.5164	C1=C4
		C1:C5	131.7723	96.6702	124.8390	C1<C5**
		C1:C6	34.1840	93.4692	121.6380	C1=C6
		C2:C3	28.4115	88.6677	116.5164	C2=C3
		C2:C4	8.9071	93.4692	121.6380	C2=C4
		C2:C5	137.6145	98.9109	127.3998	C2<C5**
		C2:C6	36.5630	96.6702	124.8390	C2=C6
		C3:C4	37.3186	96.6702	124.8390	C3=C4
		C3:C5	160.3975	100.8315	129.3204	C3<C5**
		C3:C6	63.8136	98.9109	129.3998	C3=C6
		C4:C5	124.3440	93.4692	121.6380	C4<C5**
		C4:C6	26.4950	88.6677	116.5164	C4=C6
		C5:C6	102.2124	88.6677	116.5164	C5>C6*
D	A4	D1:D2	72.9045	67.6157	88.8524	D1<D2*

* $P < .05$
** $P < .01$

Table 143

Mean Attainment Time Scores: Concept Formation Non-Verbal Task--Comparisons Within the B2 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	107.7843	87.8926	77.9005	76.2625
	C2	104.9695	84.3676	74.5437	76.2265
	C3	111.2025	90.7587	77.5158	73.6341
	C4	114.6897	95.9952	86.5081	81.9102
	C5	106.0164	81.7104	76.4871	73.1821
	C6	108.5908	90.5069	86.5795	85.7313
D	D1	108.2115	91.3261	82.7612	80.6307
	D2	109.5396	85.7511	77.0837	75.0182

Table 144

Results of Analyses of Covariance Among Mean Attainment Time Scores: Concept Formation Non-Verbal Task--Comparisons Within the B2 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	94	991.1046	623.3487	620.7520	732.4133
Regression	9	1,053.8122	730.6003	1,118.0984	968.1162
Error	85	984.4649	611.9927	568.0918	707.4565
C	5	195.2547	398.6500	428.5461	377.9602
D	1	37.6923	664.1256	688.7752	673.0709
MA	1	312.6680	62.1085	3.8967	524.5922
CA	1	101.4451	1.1332	153.8730	1,053.9161
IQ	1	26.9788	1.9606	91.5632	749.8847

Table 145

Mean Attainment Time Scores: Concept Formation Non-Verbal Task--Comparisons Within the B3 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	123.4450	98.4813	94.4110	92.5077
	C2	120.6628	103.1784	96.1200	92.1776
	C3	116.9179	89.0119	81.7080	78.2500
	C4	120.7226	106.2918	100.2740	96.2492
	C5	112.8571	89.6860	87.3462	92.9284
	C6	107.3968	93.9977	85.3894	89.3090
D	D1	116.1192	95.3054	89.0266	86.4333
	D2	117.8816	98.2436	93.0562	94.0407

Table 146

Results of Analyses of Covariance Among Mean Attainment Time Scores: Concept Formation Non-Verbal Task--Comparisons Within the B3 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	92	1,333.2665	1,088.2565	1,223.4158	1,307.1467
Regression	9	3,952.0086	3,346.0730	3,774.7437	4,141.9276
Error	83	1,049.3065	843.4330	946.7657	999.7609
C	5	529.1646	761.5750	819.6428	577.3918
D	1	70.3998	195.6691	368.0381	1,311.6872
MA	1	3,312.6080	1,273.6392	1,353.4489	2,215.6278
CA	1	8,308.5456**	4,456.6333*	4,845.4544*	6,597.2558*
IQ	1	5.843.4871*	2,297.1645	2,357.3807	3,691.5742

* P < .05
** P < .01

Table 147

Mean Attainment Time Scores: Concept Formation Non-Verbal Task--Comparisons Within the B4 Group

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
C	C1	133.2074	87.5428	67.4437	65.1052
	C2	122.7763	74.6845	64.6669	59.0029
	C3	126.7654	83.8595	64.8703	61.0772
	C4	111.1717	70.7369	57.9990	57.3214
	C5	132.5384	84.5812	66.7170	61.4350
	C6	97.8544	74.0958	65.5794	57.8581
D	D1	139.6758	80.9506	68.3486	64.1766
	D2	111.7621	77.5496	60.7436	56.4233

Table 148

Results of Analyses of Covariance Among Mean Attainment Time Scores: Concept Formation Non-Verbal Task--Comparisons Within the B4 Group

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	93	2,105.2037	1,022.5452	631.1023	475.1930
Regression	9	4,622.6962	1,618.0400	913.2445	728.4742
Error	84	1,835.4723	958.7421	600.8727	448.0557
C	5	2,882.0338	728.3812	177.9332	123.2796
D	1	7,421.3339*	267.5088	1,337.5439	1,390.2257
MA	1	896.9310	1,992.0313	369.2194	91.4451
CA	1	86.4324	241.9459	15.5676	95.1081
IQ	1	281.0107	1,276.1354	160.3710	14.7249

* $P < .05$

Table 149

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Attainment Time Scores: Concept Formation Non-Verbal Task--Comparisons Within the B4 Group

Variable	Level of Practice	Comparison	$\frac{(b_i - b_j)\ x}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$z_{.05}S$	$z_{.01}S$	Results
D	A1	D1:D2	121.4957	118.6945	155.9740	D1>D2*

* $P < .05$

Table 150

Mean Attainment Time Scores: Concept Formation Non-Verbal Task--Comparisons of the Four B Groups (MA, CA, and IQ Not Controlled Statistically)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	112.1145	79.7020	66.0879	63.5049
	B2	108.8027	88.5399	79.8862	77.7755
	B3	117.0823	96.9009	91.2743	90.4291
	B4	120.6053	79.1672	64.4172	60.1797

Table 151

Results of Analyses of Covariance Among Mean Attainment Time Scores: Concept Formation Non-Verbal Task--Comparisons of the Four B Groups (MA, CA, and IQ Not Controlled Statistically)

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Squar A4
Total	372	1406.81	857.57	835.37	915.33
Regression	9	2152.46	2266.22	5055.05	6136.06
Error	363	1388.32	822.64	730.75	785.89
B	3	2571.38	6548.49***	14849.76***	18013.69***

*** $P < .001$

Table 152

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Attainment Time Scores: Concept Formation Non-Verbal Task--Comparisons of the Four B Groups (MA, CA, and IQ Not Controlled Statistically)

Variable	Level of Practice	Comparison	$\frac{(b_i - b_j) \times}{\sqrt{2/c_{ii}+c_{jj}-2c_{ij}}}$	$Z_{.05}S$	$Z_{.01}S$	Results
B	A2	B1:B2	85.22	79.45	104.40	B1<B2*
		B1:B3	164.43	83.75	108.99	B1<B3**
		B1:B4	5.00	79.45	104.40	B1=B4
		B2:B3	81.13	86.62	111.86	B2=B3
		B2:B4	91.17	83.75	108.99	B2>B4*
		B3:B4	170.82	86.62	111.86	B3>B4**
B	A3	B1:B2	133.03	74.89	98.41	B1<B2**
		B1:B3	240.82	78.95	102.74	B1<B3**
		B1:B4	26.65	74.89	98.41	B1=B4
		B2:B3	110.60	74.89	98.41	B2<B3**
		B2:B4	150.68	78.95	102.74	B2>B4**
		B3:B4	258.93	81.65	105.44	B3>B4**
B	A4	B1:B2	137.56	77.65	102.04	B1<B2**
		B1:B3	257.45	81.86	106.53	B1<B3**
		B1:B4	31.94	77.65	102.04	B1=B4
		B2:B3	122.93	84.66	109.33	B2<B3**
		B2:B4	171.33	81.86	106.53	B2>B4**
		B3:B4	291.61	84.66	109.33	B3>B4**

* $P < .05$
** $P < .01$

Table 153

Mean Absolute Goal Discrepancy Scores: Concept Formation Non-Verbal Task

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	7.6140	36.3122	31.9387	12.5831
	B2	8.0828	16.7697	27.3856	12.7589
	B3	4.6494	23.8738	29.4772	15.7072
	B4	5.6310	31.7959	28.1585	8.2544
C	C1	6.2089	19.4098	20.0317	10.5606
	C2	5.2317	23.2376	23.1044	9.9235
	C3	8.5361	24.7375	23.9789	11.6208
	C4	6.9463	26.3976	49.5835	13.4416
	C5	5.5485	42.1570	29.5015	16.0830
D	D1	5.7328	24.7714	29.0586	11.0730
	D2	7.2558	29.6044	29.4214	13.5788
S	S1	7.3412	24.9220	26.2821	12.0368
	S2	5.6474	29.4538	32.1979	12.6150
BC	B1C1	6.6625	28.5258	28.1305	11.4370
	B1C2	3.2474	26.2731	24.7727	10.3437
	B1C3	8.6028	34.0850	18.5538	8.8354
	B1C4	6.8266	42.7733	62.9831	10.6188
	B1C5	12.7307	49.9038	25.2534	21.6806
	B2C1	7.4499	12.0518	16.1144	11.5310
	B2C2	9.1421	15.5804	16.6802	9.5883
	B2C3	8.6861	12.2703	22.3661	13.8261
	B2C4	7.8237	17.7544	50.2341	14.3257
	B2C5	7.3122	26.1916	31.5332	14.5234
	B3C1	4.2718	18.0021	23.9119	14.2185
	B3C2	2.4244	15.8337	17.0860	11.9995
	B3C3	4.7562	14.0936	26.4486	14.9105
	B3C4	8.9542	16.1000	43.2257	19.3078
	B3C5	2.8404	55.3396	36.7138	18.0997
	B4C1	6.4514	19.0603	11.9700	5.0559
	B4C2	6.1129	35.2632	33.8787	7.7625
	B4C3	12.0993	38.5011	28.5471	8.9112
	B4C4	4.1807	28.9627	41.8911	9.5141
	B4C5	-0.6893	37.1930	24.5056	10.0283

Table 153 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
BD	B1D1	6.9728	29.5181	27.4691	9.5497
	B2D1	6.3313	21.3787	31.2264	13.6523
	B3D1	3.3986	15.3243	27.8125	13.3384
	B4D1	6.2285	32.8645	29.7264	7.7516
	B1D2	8.2552	43.1063	36.4083	15.6165
	B2D2	9.8343	12.1607	23.5448	11.8655
	B3D2	5.9002	32.4233	31.1419	18.0760
	B4D2	5.0335	30.7273	26.5906	8.7572
BS	B1S1	5.9312	34.7962	26.4264	11.8710
	B2S1	8.2274	13.4809	21.8908	10.1002
	B3S1	6.7674	17.4193	31.3049	17.3741
	B4S1	8.4388	33.9916	26.0663	8.8019
	B1S2	7.0574	37.8282	37.4510	13.2952
	B2S2	7.9382	20.0585	33.4404	15.4176
	B3S2	2.5314	30.3283	27.6495	14.0403
	B4S2	7.8826	29.6002	30.2507	7.7069
CD	C1D1	4.5309	17.8444	19.6245	11.6190
	C2D1	6.2781	21.8720	20.0051	8.5101
	C3D1	9.7339	23.3058	23.7289	9.4695
	C4D1	5.5347	26.3266	55.8280	13.2386
	C5D1	2.5864	34.5082	26.1065	12.5278
	C1D2	7.8869	20.9752	20.4389	9.5022
	C2D2	4.1853	24.6032	26.2037	11.3369
	C3D2	7.3383	26.1692	24.2289	13.7721
	C4D2	8.3579	26.4686	43.3390	13.6446
	C5D2	8.5106	49.8058	32.8965	19.6382
CS	C1S1	7.0977	20.3733	19.1290	9.7408
	C2S1	5.0348	22.9072	24.2812	10.7105
	C3S1	8.9902	24.2301	24.0849	10.7056
	C4S1	10.2239	22.2003	35.2356	14.9125
	C5S1	5.3594	34.8991	28.6798	14.1146
	C1S2	5.3201	18.4463	20.9344	11.3804
	C2S2	5.4286	23.5680	21.9276	9.1365
	C3S2	8.0820	25.2449	23.8729	12.5360
	C4S2	3.6687	30.5949	63.9314	11.9707
	C5S2	5.7376	49.4149	30.3232	18.0514

Table 153 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
DS	D1S1	1.7775	22.4823	23.9539	10.7284
	D2S1	7.3005	27.3153	24.3167	13.2342
	D1S2	5.6881	27.0605	34.1633	11.4176
	D2S2	7.2111	31.8935	34.5261	13.9234

Table 154

Results of Analyses of Covariance Among Mean Absolute Goal Discrepancy Scores: Concept Formation Non-Verbal Task

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	312	183.50	2,353.55	2,586.29	392.47
Regression	39	521.24	7,431.40	8,671.33	1,417.75
Error	273	135.25	1,628.15	1,717.00	246.00
B	3	103.87	1,968.10	263.28	226.32
C	4	104.18	4,695.87*	8,567.33***	377.61
D	1	173.17	1,743.97	9.83	468.79
S	1	201.43	1,441.81	2,456.92	23.47
BC	12	171.21	1,033.43	911.63	95.71
BD	3	75.61	2,919.91	977.54	235.99
BS	3	281.45	908.16	931.87	240.92
CD	4	201.31	542.13	893.34	190.81
CS	4	118.73	650.31	2,374.73	112.19
DS	1	187.61	0.16	1,343.52	0.90
MA	1	179.22	267.44	1,476.06	331.16
CA	1	682.45*	4,423.17	4,553.64	262.57
IQ	1	403.14	1,475.43	2,982.30	317.70

* P < .05
*** P < .001

Table 155

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Absolute Goal Discrepancy Scores: Concept Formation Non-Verbal Task

Variable	Level of Practice	Comparison	$(b_i - b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$z_{.05}S$	$z_{.01}S$	Results
C	A2	C1:C2	29.6501	111.7695	146.8740	C1=C2
		C1:C3	40.9226	117.8220	153.3300	C1=C3
		C1:C4	54.5761	121.8570	157.3650	C1=C4
		C1:C5	177.6602	124.6815	160.5930	C1<C5**
		C2:C3	11.6182	111.7695	146.8740	C2=C3
		C2:C4	24.6802	117.8220	153.3300	C2=C4
		C2:C5	147.7643	121.8570	157.3650	C2<C5*
		C3:C4	12.7514	111.7695	146.8740	C3=C4
		C3:C5	134.9314	117.8220	153.3300	C3<C5*
		C4:C5	124.0895	111.7695	146.8740	C4<C5*
C	A3	C1:C2	23.8017	114.7797	150.8296	C1=C2
		C1:C3	30.3193	120.9952	157.4595	C1=C3
		C1:C4	230.8061	128.0394	164.9181	C1<C4**
		C1:C5	73.9613	125.1388	161.6031	C1=C5
		C2:C3	6.7738	114.7797	150.8296	C2=C3
		C2:C4	206.8071	125.1388	161.6031	C2<C4**
		C2:C5	49.9624	120.9952	157.4595	C2=C5
		C3:C4	196.6716	120.9952	157.4595	C3<C4**
		C3:C5	42.7779	114.7797	150.8296	C3=C5
		C4:C5	158.1260	114.7797	150.8296	C4>C5**

** P < .01

Table 156

Mean Positive Goal Discrepancy Scores:
Concept Formation Non-Verbal Task

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	4.9334	5.3899	3.8176	1.0255
	B2	5.6837	2.7318	2.0314	4.8458
	B3	6.5434	5.2805	7.9785	8.7673
	B4	1.7879	5.4642	5.8137	-0.6482
C	C1	4.1002	2.9650	2.6880	2.5997
	C2	3.1312	4.2309	4.2567	2.5755
	C3	7.2244	4.9929	4.2912	3.5113
	C4	4.3938	3.7633	5.4355	3.5108
	C5	4.8359	7.6309	7.8801	5.2907
D	D1	4.2878	4.2312	4.6836	3.1753
	D2	5.1864	5.2020	5.1370	3.8199
S	S1	4.8995	4.1873	4.1562	2.9553
	S2	4.5747	5.2459	5.6644	4.0399
BC	B1C1	3.6399	4.4269	3.6461	-0.1187
	B1C2	0.6399	3.5040	3.5342	0.6755
	B1C3	6.3050	7.0230	4.9878	1.5391
	B1C4	3.7470	3.8144	2.4969	1.0226
	B1C5	10.3352	8.1812	4.4230	4.0542
	B2C1	5.9803	1.2795	0.9840	4.7499
	B2C2	6.7451	3.2263	0.9284	3.0004
	B2C3	6.1716	3.3574	2.8273	5.8186
	B2C4	4.0856	2.2837	1.2862	7.7959
	B2C5	5.4359	3.5121	4.1311	2.8642
	B3C1	6.4373	3.5028	4.8297	7.6399
	B3C2	4.6449	3.4990	4.4705	7.4919
	B3C3	7.7541	2.5989	4.5732	7.2014
	B3C4	8.3751	3.9626	7.9046	7.7452
	B3C5	5.5056	12.8392	18.1145	13.7581
	B4C1	0.3433	2.6508	1.2922	-1.8723
	B4C2	0.4949	6.6943	8.0937	-0.8658
	B4C3	8.6669	6.9923	4.7765	-0.5139
	B4C4	1.3675	4.9925	10.0543	-0.4753
	B4C5	-1.9331	5.9911	4.8518	0.4863

Table 156 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
BD	B1D1	4.4552	4.4170	4.2394	-0.0946
	B2D1	4.3117	3.6479	1.6439	5.5322
	B3D1	6.3845	2.9484	6.0783	8.1956
	B4D1	1.9998	5.9115	6.7728	-0.9320
	B1D2	5.4116	6.3628	3.3958	2.1456
	B2D2	7.0557	1.8157	2.4189	4.1594
	B3D2	6.7023	7.6126	9.8787	9.3390
	B4D2	1.5760	5.0169	4.8546	-0.3644
BS	B1S1	3.3673	5.5413	4.5965	1.3506
	B2S1	5.6114	1.7868	1.8533	2.8828
	B3S1	8.0777	3.6034	5.1654	8.0318
	B4S1	2.5416	5.8177	5.0096	-0.4440
	B1S2	6.4995	5.2385	3.0387	0.7004
	B2S2	5.7560	3.6768	2.2095	6.8088
	B3S2	5.0091	6.9576	10.7916	9.5028
	B4S2	1.0342	5.1107	6.6178	-0.8524
CD	C1D1	3.9518	2.2080	2.3096	2.9061
	C2D1	3.5868	4.4204	3.5726	2.3217
	C3D1	7.7809	4.5247	4.8326	2.2773
	C4D1	3.9813	4.2104	7.7932	4.5185
	C5D1	2.1382	5.7925	4.9100	3.8529
	C1D2	4.2486	3.7217	3.0664	2.2933
	C2D2	2.6756	4.0414	4.9408	2.8293
	C3D2	6.6679	5.4611	3.7498	4.7453
	C4D2	4.8063	3.3162	3.0778	2.5031
	C5D2	7.5336	9.4693	10.8502	6.7285
CS	C1S1	3.9852	3.1026	2.1859	2.3341
	C2S1	1.8253	4.0460	3.9244	2.9998
	C3S1	7.5318	4.9268	5.4157	3.1334
	C4S1	6.7703	3.3983	4.0797	2.1365
	C5S1	4.3849	5.4628	5.1753	4.1727
	C1S2	4.2152	2.8274	3.1901	2.8653
	C2S2	4.4371	4.4158	4.5890	2.1512
	C3S2	6.9170	5.0590	3.1667	3.8892
	C4S2	2.0173	4.1283	6.7913	4.8851
	C5S2	5.2869	9.7990	10.5849	6.4087

Table 156 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
DS	D1S1	3.8432	3.9346	4.3074	2.6057
	D2S1	4.7418	4.9054	4.7608	3.2503
	D1S2	4.7324	4.5278	5.0598	3.7449
	D2S2	5.6310	5.4986	5.5132	4.3895

Table 157

Results of Analyses of Covariance Among Mean Positive Goal Discrepancy Scores: Concept Formation Non-Verbal Task

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Squar A4
Total	312	124.63	108.89	161.96	73.69
Regression	39	287.93	262.52	364.56	158.45
Error	273	101.31	86.95	133.02	61.58
B	3	102.71	71.40	251.76	80.97
C	4	137.71	195.35	226.54	74.42
D	1	60.30	70.37	15.35	31.03
S	1	7.41	78.69	159.70	82.59
BC	12	120.20	69.27	170.60	59.41
BD	3	33.90	160.83	116.12	42.46
BS	3	122.45	64.08	162.76	78.51
CD	4	106.57	49.27	224.34	64.04
CS	4	109.56	49.01	105.71	30.11
DS	1	107.40	15.78	41.62	0.22
MA	1	47.53	0.01	1.64	106.00
CA	1	159.13	164.41	370.13	72.99
IQ	1	11.28	76.89	268.47	322.14*

* $P < .05$

Table 158

Mean Negative Goal Discrepancy Scores:
Concept Formation Non-Verbal Task

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
B	B1	-2.6781	-3.3724	-4.6058	-3.1889
	B2	-2.3966	-2.0002	-2.0850	-1.6651
	B3	+1.8965	-1.5512	-1.0276	-0.4137
	B4	-3.8406	-2.4662	-4.6420	-2.5831
C	C1	-2.1062	-1.9931	-1.7013	-1.6197
	C2	-2.0980	-1.8553	-2.4656	-1.5769
	C3	-1.3092	-1.6957	-2.8518	-2.3401
	C4	-2.5500	-2.5047	-6.3363	-2.6098
	C5	-0.7101	-1.0063	-2.0955	-1.6670
D	D1	-1.4426	-2.5719	-3.2714	-1.7658
	D2	-2.0668	-2.1231	-2.9088	-2.1596
S	S1	-2.4392	-1.9860	-2.2164	-2.0155
	S2	-1.0702	-2.7090	-3.9638	-1.9099
BC	B1C1	-3.0201	-3.6919	-4.3043	-3.8771
	B1C2	-2.6050	-2.1788	-3.6767	-2.9424
	B1C3	-2.2954	-1.0968	-2.2812	-2.6991
	B1C4	-3.0771	-5.3319	-9.7794	-3.9626
	B1C5	-2.3929	-1.8802	-2.9874	-2.4633
	B2C1	-1.4671	-0.6022	+0.0095	+0.0320
	B2C2	-2.3945	-1.8142	-1.2828	-1.4004
	B2C3	-2.5120	-2.2018	-3.1247	-2.5126
	B2C4	-3.7356	-1.7975	-5.5367	-1.8176
	B2C5	-1.8738	-0.9029	-0.4903	-2.6269
	B3C1	+2.1680	-1.4755	+0.0067	+0.0636
	B3C2	+2.2230	-1.4050	-0.6692	+0.5540
	B3C3	+3.0004	-2.0207	-2.3040	-1.6158
	B3C4	-0.5766	-1.3153	-1.5765	-1.6643
	B3C5	+2.6677	+1.1429	-0.5950	+0.5940
	B4C1	-6.1056	-2.2028	-2.5171	-2.6973
	B4C2	-5.6155	-2.0232	-4.2337	-2.5188
	B4C3	-3.4298	-1.4635	-3.6973	-2.5329
	B4C4	-2.8107	-1.5741	-8.4526	-2.9947
	B4C5	-1.2414	-2.3850	-4.3093	-2.1718

Table 158 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
BD	B1D1	-2.5152	-3.0417	-3.6864	-3.0766
	B2D1	-2.0172	-2.7255	-3.1977	-1.7794
	B3D1	+2.9882	-1.2551	-0.6249	+0.4852
	B4D1	-4.2262	-3.2653	-5.5766	-2.6924
	B1D2	-2.8410	-3.7031	-5.5252	-3.3012
	B2D2	-2.7760	-1.2749	-0.9723	-1.5508
	B3D2	+0.8048	-1.8473	-1.4303	-1.3126
	B4D2	-3.4550	-1.6667	-3.7074	-1.8514
BS	B1S1	-2.5614	-1.8501	-2.8542	-2.6924
	B2S1	-2.6135	-1.9242	-0.7603	-1.5495
	B3S1	+1.3128	-1.8765	-1.9265	-1.0009
	B4S1	-5.8947	-2.2932	-3.3246	-2.8192
	B1S2	-2.7948	-4.8947	-6.3574	-3.6854
	B2S2	-2.1797	-2.0762	-3.4097	-1.7807
	B3S2	+2.4802	-1.2259	-0.1287	+0.1735
	B4S2	-1.7865	-2.6392	-5.9594	-1.2782
CD	C1D1	-0.5768	-2.6280	-2.0980	-1.9928
	C2D1	-2.6888	-1.7911	-2.1365	-1.2378
	C3D1	-1.9506	-1.9691	-3.1277	-2.3546
	C4D1	-1.5510	-2.5925	-7.5609	-2.1933
	C5D1	-0.4458	-1.1964	-1.4339	-1.0505
	C1D2	-3.6356	-1.3582	-1.3046	-1.2466
	C2D2	-1.5072	-1.9195	-2.7947	-1.9160
	C3D2	-0.6678	-1.4223	-2.5759	-2.3256
	C4D2	-3.5490	-2.4169	-5.1117	-3.0263
	C5D2	-0.9744	-0.8162	-2.7571	-2.2835
CS	C1S1	-3.1099	-1.8644	-1.3864	-1.3537
	C2S1	-3.2071	-1.9355	-2.7245	-1.5863
	C3S1	-1.4559	-1.5809	-2.5307	-2.7224
	C4S1	-3.4511	-1.2732	-2.6793	-3.0129
	C5S1	-0.9720	-0.5936	-1.7611	-1.4022
	C1S2	-1.1025	-2.1218	-2.0162	-1.8857
	C2S2	-0.9889	-1.7751	-2.2067	-1.5675
	C3S2	-1.1625	-1.8105	-3.1729	-1.9578
	C4S2	-1.6489	-3.7362	-9.9933	-2.2067
	C5S2	-0.4482	-1.4190	-2.4299	-1.9318

Table 158 (Continued)

Variable	Variant	Level of Practice (A)			
		A1	A2	A3	A4
DS	D1S1	-1.9319	-2.4433	-1.9950	-1.7128
	D2S1	-2.5561	-1.9945	-1.6324	-2.1066
	D1S2	-0.9533	-2.7005	-4.5478	-1.8188
	D2S2	-1.5775	-2.2517	-4.1852	-2.2126

Table 159

Results of Analyses of Covariance Among Mean Negative Goal Discrepancy Scores: Concept Formation Non-Verbal Task

Source	df	Mean Square A1	Mean Square A2	Mean Square A3	Mean Square A4
Total	312	58.87	29.12	70.16	18.98
Regression	39	75.17	65.32	144.26	44.51
Error	273	56.54	23.95	59.58	15.33
B	3	92.28	13.44	13.05	11.80
C	4	32.84	39.86	212.17**	13.99
D	1	29.10	15.04	9.82	11.57
S	1	131.57	36.70	214.35	0.78
BC	12	24.47	19.00	30.62	10.65
BD	3	27.81	28.36	73.02	17.26
BS	3	61.77	45.29	102.18	15.10
CD	4	55.71	4.20	31.56	9.34
CS	4	11.25	15.43	143.55	6.05
DS	1	11.11	15.81	47.28	3.26
MA	1	42.16	10.32	3.74	26.26
CA	1	182.50	11.90	75.21	0.01
IQ	1	279.55*	2.88	8.73	26.01

* $P < .05$
** $P < .01$

Table 160

Results of Kramer's Multiple Range Test of Differences Between Pairs of Mean Negative Goal Discrepancy Scores: Concept Formation Non-Verbal Task

Variable	Level of Practice	Comparison	$(b_i - b_j) \times \sqrt{2/c_{ii}+c_{jj}-2c_{ij}}$	$z_{.05}S$	$z_{.01}S$	Results
C	A3	C1:C2	5.9202	22.5389	29.3314	C1=C2
		C1:C3	8.8374	23.3108	30.1033	C1=C3
		C1:C4	36.2000	23.8511	30.7208	C1>C4**
		C1:C5	3.0789	21.3811	28.0964	C1=C5
		C2:C3	2.9919	21.3811	28.0964	C2=C3
		C2:C4	30.2307	22.5389	29.3314	C2>C4**
		C2:C5	2.8904	21.3811	28.0964	C2=C5
		C3:C4	26.7642	21.3811	28.0964	C3>C4*
		C3:C5	4.8585	22.5389	29.3314	C3=C5
		C4:C5	33.3917	23.3108	30.1033	C4<C5**

* $P < .05$
** $P < .01$

TABLE 161

COMPARISON OF THE GROUPS IN TERMS OF DIRECTIONS OF GOAL CHANGE AFTER SUCCESS AND FAILURE: CONCEPT FORMATION NON-VERBAL TASK (FREQUENCIES)

Comparison	Trial 3				Trial 4				Trial 11				Trial 12			
	Direction				Direction				Direction				Direction			
	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T
B1D1C1	7	0	1	8	7	1	0	8	7	1	0	8	7	1	0	8
B1D1C2	7	0	1	8	8	0	0	8	7	0	1	8	8	0	0	8
B1D1C5	7	0	0	7	6	0	0	6	2	0	1	3	2	0	0	2
B1D2C1	7	1	0	8	6	2	0	8	7	1	0	8	6	2	0	8
B1D2C2	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B1D2C5	5	0	0	5	4	0	0	4	3	0	0	3	0	1	0	1
B2D1C1	7	0	1	8	8	0	0	8	7	0	1	8	7	0	1	8
B2D1C2	7	0	1	8	6	0	2	8	7	0	1	8	8	0	0	8
B2D1C5	6	0	0	6	6	0	0	6	3	0	0	3	2	0	1	3
B2D2C1	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B2D2C2	6	0	2	8	6	0	2	8	7	1	0	8	5	1	2	8
B2D2C5	6	0	0	6	4	0	0	4	4	0	0	4	3	1	0	4
B3D1C1	7	0	1	8	7	0	1	8	6	0	2	8	6	0	2	8
B3D1C2	8	0	0	8	7	1	0	8	7	1	0	8	7	0	1	8
B3D1C5	6	0	0	6	3	0	0	3	5	0	0	5	3	0	0	3
B3D2C1	6	1	1	8	7	0	1	8	8	0	0	8	8	0	0	8
B3D2C2	7	0	1	8	7	0	1	8	6	1	1	8	7	0	1	8
B3D2C5	4	0	0	4	5	0	0	5	5	0	0	5	2	0	0	2
B4D1C1	6	1	1	8	4	2	2	8	8	0	0	8	8	0	0	8
B4D1C2	7	0	1	8	8	0	0	8	7	1	0	8	6	1	1	8
B4D1C5	8	0	0	8	2	0	0	2	3	0	0	3	5	0	0	5
B4D2C1	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B4D2C2	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B4D2C5	6	0	0	6	4	0	0	4	7	0	0	7	0	0	0	0

	Trial 3				Trial 4				Trial 11				Trial 12			
	Direction				Direction				Direction				Direction			
	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T
B1D1C3	0	7	1	8	0	6	2	8	0	6	2	8	0	6	2	8
B1D1C4	1	6	1	8	1	7	0	8	0	5	3	8	0	6	2	8
B1D1C5	0	0	1	1	0	2	0	2	0	5	0	5	1	4	1	6
B1D2C3	1	6	1	8	2	5	1	8	1	4	3	8	0	5	3	8
B1D2C4	1	6	1	8	1	5	2	8	0	6	2	8	0	6	2	8
B1D2C5	1	2	0	3	0	3	1	4	1	2	2	5	1	5	1	7
B2D1C3	0	8	0	8	1	7	0	8	0	7	1	8	0	7	1	8
B2D1C4	0	6	2	8	0	7	1	8	1	5	2	8	0	8	0	8
B2D1C5	0	1	1	2	1	0	1	2	0	4	1	5	0	5	0	5
B2D2C3	0	7	1	8	1	6	1	8	0	7	1	8	2	6	0	8
B2D2C4	0	5	3	8	0	6	2	8	0	6	2	8	0	6	2	8
B2D2C5	1	1	0	2	1	2	1	4	0	4	0	4	2	2	0	4

TABLE 161 (Continued)

Comparison	Trial 3				Trial 4				Trial 11				Trial 12			
	Direction				Direction				Direction				Direction			
	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T
B3D1C3	0	6	2	8	0	7	1	8	2	4	2	8	0	6	2	8
B3D1C4	0	6	2	8	0	8	0	8	1	5	2	8	0	6	2	8
B3D1C5	0	2	0	2	1	4	0	5	0	2	1	3	0	5	0	5
B3D2C3	0	4	4	8	0	7	1	8	0	5	3	8	0	7	1	8
B3D2C4	1	7	0	8	0	8	0	8	3	3	2	8	1	7	0	8
B3D2C5	0	2	2	4	0	3	0	3	1	2	0	3	1	5	0	6
B4D1C3	0	5	3	8	3	5	0	8	1	6	1	8	2	3	3	8
B4D1C4	2	6	0	8	2	6	0	8	1	6	1	8	1	6	1	8
B4D1C5	0	0	0	0	0	3	3	6	0	4	1	5	0	2	1	3
B4D2C3	1	3	4	8	1	6	1	8	1	3	4	8	0	7	1	8
B4D2C4	0	7	1	8	1	6	1	8	2	5	1	8	2	4	2	8
B4D2C5	0	2	0	2	1	3	0	4	0	1	0	1	2	5	1	8

	Trial 5				Trial 8				Trial 9				Trial 13			
	Direction				Direction				Direction				Direction			
	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T
B1D1C1	7	1	0	8	6	1	1	8	7	1	0	8	7	1	0	8
B1D1C2	8	0	0	8	6	0	2	8	8	0	0	8	7	0	1	8
B1D1C3	6	0	2	8	7	0	1	8	6	0	2	8	8	0	0	8
B1D1C5	4	0	0	4	6	0	0	6	2	0	0	2	2	0	0	2
B1D2C1	7	0	1	8	6	2	0	8	6	2	0	8	6	2	0	8
B1D2C2	8	0	0	8	8	0	0	8	7	0	1	8	8	0	0	8
B1D2C3	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B1D2C5	6	0	0	6	4	0	1	5	4	0	0	4	6	0	0	6
B2D1C1	8	0	0	8	6	2	0	8	8	0	0	0	5	0	3	8
B2D1C2	8	0	0	8	8	0	0	8	6	0	2	8	7	0	1	8
B2D1C3	6	0	2	8	7	0	1	8	8	0	0	8	6	0	2	8
B2D1C5	6	0	0	6	6	0	0	6	4	0	1	5	5	0	0	5
B2D2C1	7	0	1	8	7	0	1	8	8	0	0	8	8	0	0	8
B2D2C2	6	0	2	8	4	2	2	8	5	0	3	8	6	1	1	8
B2D2C3	6	1	1	8	7	0	1	8	6	1	1	8	4	1	3	8
B2D2C5	5	0	0	5	7	0	0	7	5	0	0	5	2	0	0	2
B3D1C1	7	0	1	8	6	0	2	8	6	0	2	8	6	0	2	8
B3D1C2	7	1	0	8	7	1	0	8	7	0	1	8	7	0	1	8
B3D1C3	7	1	0	8	7	1	0	8	6	2	0	8	7	0	1	8
B3D1C5	8	0	0	8	6	0	0	6	2	1	0	3	5	1	2	8
B3D2C1	6	1	1	8	8	0	0	8	8	0	0	8	7	0	1	8
B3D2C2	7	0	1	8	7	0	1	8	8	0	0	8	7	0	1	8
B3D2C3	5	1	2	8	6	0	2	8	5	1	2	8	6	0	2	8
B3D2C5	5	0	0	5	4	0	0	4	4	0	0	4	7	0	0	7
B4D1C1	7	0	1	8	8	0	0	8	8	0	0	8	7	0	1	8
B4D1C2	5	0	3	8	7	0	1	8	8	0	0	8	7	0	1	8
B4D1C3	8	0	0	8	6	0	2	8	7	0	1	8	7	0	1	8
B4D1C5	5	0	0	5	4	0	0	4	3	0	0	3	3	0	0	3
B4D2C1	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B4D2C2	8	0	0	8	7	0	1	8	8	0	0	8	8	0	0	8
B4D2C3	8	0	0	8	8	0	0	8	8	0	0	8	8	0	0	8
B4D2C5	5	0	1	6	4	0	0	4	5	0	0	5	2	0	0	2

Table 161 (Continued)

Comparison	Trial 6				Trial 7				Trial 10				Trial 14			
	Direction				Direction				Direction				Direction			
	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T	FR	FL	FNC	T
B1D1C2	1	6	1	8	0	7	1	8	3	3	2	8	0	5	3	8
B1D1C3	0	6	2	8	0	6	2	8	0	7	1	8	0	5	3	8
B1D1C4	1	6	1	8	2	5	1	8	1	4	3	8	0	6	2	8
B1D1C5	0	3	0	3	1	3	1	5	0	2	1	3	1	3	1	5
B1D2C2	0	7	1	8	0	7	1	8	0	8	0	8	1	5	2	8
B1D2C3	1	4	3	8	1	6	1	8	0	6	2	8	0	6	2	8
B1D2C4	1	5	2	8	0	6	2	8	0	6	2	8	1	5	2	8
B1D2C5	1	4	0	5	1	0	0	1	0	4	1	5	2	3	1	6
B2D1C2	0	7	1	8	1	7	0	8	0	6	2	8	0	5	3	8
B2D1C3	0	7	1	8	0	8	0	8	1	7	0	8	0	8	0	8
B2D1C4	0	6	2	8	1	6	1	8	2	5	1	8	2	4	2	8
B2D1C5	0	1	2	3	0	2	1	3	0	3	0	3	0	2	2	4
B2D2C2	4	4	0	8	4	4	0	8	1	3	4	8	1	4	3	8
B2D2C3	1	7	0	8	1	7	0	8	2	6	0	8	0	8	0	8
B2D2C4	0	5	3	8	0	5	3	8	0	5	3	8	0	6	2	8
B2D2C5	0	5	0	5	0	4	0	4	0	3	1	4	1	2	1	4
B3D1C2	0	7	1	8	0	6	2	8	0	7	1	8	0	7	1	8
B3D1C3	0	7	1	8	0	7	1	8	0	6	2	8	0	6	2	8
B3D1C4	0	6	2	8	0	7	1	8	0	4	4	8	2	3	3	8
B3D1C5	1	2	0	3	0	4	0	4	1	2	0	3	0	4	0	4
B3D2C2	0	8	0	8	0	8	0	8	0	7	1	8	1	5	2	8
B3D2C3	1	5	2	8	0	8	0	8	0	7	1	8	0	8	0	8
B3D2C4	2	4	2	8	1	6	1	8	1	7	0	8	2	6	0	8
B3D2C5	1	3	0	4	1	2	2	5	0	4	0	4	0	4	0	4
B4D1C2	0	7	1	8	0	6	2	8	1	5	2	8	1	7	0	8
B4D1C3	2	5	1	8	2	5	1	8	2	6	0	8	1	6	1	8
B4D1C4	2	5	1	8	1	6	1	8	0	7	1	8	2	4	2	8
B4D1C5	0	1	0	1	1	1	1	3	0	1	1	2	0	2	0	2
B4D2C2	2	6	0	8	0	6	2	8	1	7	0	8	1	7	0	8
B4D2C3	0	6	2	8	1	3	4	8	0	6	2	8	1	6	1	8
B4D2C4	2	4	2	8	0	6	2	8	2	4	2	8	1	5	2	8
B4D2C5	1	5	1	7	1	0	1	2	1	1	1	3	0	5	2	7

TABLE 161 (Continued)

Comparison	Trial 15				Trial 16				Trial 17			
	Direction				Direction				Direction			
	SR	SL	SNC	T	SR	SL	SNC	T	SR	SL	SNC	T
B1D1C1	8	0	0	8	7	1	0	8	8	0	0	8
B1D1C2	7	0	1	8	8	0	0	8	8	0	0	8
B1D1C3	7	0	1	8	8	0	0	8	8	0	0	8
B1D1C4	7	0	1	8	8	0	0	8	7	0	1	8
B1D1C5	2	0	0	2	5	0	0	5	2	0	0	2
B1D2C1	6	1	1	8	6	2	0	8	6	1	1	8
B1D2C2	6	1	1	8	8	0	0	8	8	0	0	8
B1D2C3	7	0	1	8	8	0	0	8	8	0	0	8
B1D2C4	5	0	3	8	5	1	2	8	5	0	3	8
B1D2C5	3	0	0	3	2	0	0	2	2	0	0	2
B2D1C1	7	0	1	8	8	0	0	8	8	0	0	8
B2D1C2	8	0	0	8	7	1	0	8	8	0	0	8
B2D1C3	8	0	0	8	6	0	2	8	8	0	0	8
B2D1C4	4	3	1	8	7	1	0	8	7	1	0	8
B2D1C5	4	1	0	5	5	0	0	5	2	0	1	3
B2D2C1	8	0	0	8	8	0	0	8	8	0	0	8
B2D2C2	5	2	1	8	6	1	1	8	5	0	3	8
B2D2C3	7	0	1	8	4	2	2	8	6	1	1	8
B2D2C4	7	0	1	8	7	0	1	8	7	0	1	8
B2D2C5	2	1	0	3	5	1	0	6	4	0	0	4
B3D1C1	6	0	2	8	7	0	1	8	6	0	2	8
B3D1C2	7	0	1	8	8	0	0	8	7	1	0	8
B3D1C3	6	2	0	8	6	2	0	8	8	0	0	8
B3D1C4	6	1	1	8	7	1	0	8	6	1	1	8
B3D1C5	3	0	1	4	4	0	0	4	2	0	0	2
B3D2C1	6	1	1	8	8	0	0	8	8	0	0	8
B3D2C2	7	0	1	8	6	0	2	8	6	0	2	8
B3D2C3	6	1	1	8	5	3	0	8	6	1	1	8
B3D2C4	7	1	0	8	5	1	2	8	7	1	0	8
B3D2C5	5	0	0	5	5	0	0	5	1	0	0	1
B4D1C1	8	0	0	8	8	0	0	8	7	1	0	8
B4D1C2	8	0	0	8	7	1	0	8	8	0	0	8
B4D1C3	7	0	1	8	8	0	0	8	8	0	0	8
B4D1C4	7	0	1	8	7	0	1	8	6	0	2	8
B4D1C5	4	0	0	4	3	0	0	3	1	0	0	1
B4D2C1	8	0	0	8	8	0	0	8	8	0	0	8
B4D2C2	7	0	1	8	8	0	0	8	8	0	0	8
B4D2C3	8	0	0	8	7	0	1	8	8	0	0	8
B4D2C4	8	0	0	8	8	0	0	8	7	1	0	8
B4D2C5	6	0	0	6	2	0	0	2	4	0	0	4

CHAPTER IV

DISCUSSION AND CONCLUSIONS

Cited in Chapter I was the purpose of this investigation: to wit, to study the effects and interaction effects of selected reinforcement, subject, and task variables on learning performance and level of aspiration behavior. Pursuing this purpose involved the procedures described in Chapter II. The tables in Chapter III include data obtained and analyzed by these procedures. In the current chapter, relationships implicit in the data are considered and generalizations are proposed. The contents of this chapter are presented in terms of the following topics: sources of the statistical data, summary of statistical data, discussion, and conclusions.

Sources of Statistical Data

Specified below are the sources of data pertinent to each objective presented in Chapter I as following from the purpose of this investigation. That is, cited for each objective are the alphanumeric combinations used in Chapter II and Chapter III to designate the several variables. These sources of data are germane to the four practice levels and to the several response measures: learning performance--attainment times and number of responses scores; level of aspiration behavior--absolute, positive, and negative goal discrepancy scores and frequencies of changes of goals in the various directions after success or failure.

A. Effects of the reinforcement variables on (a) learning performance and (b) level of aspiration behavior.

   1. Reinforcement type-frequency: C, C1 through C6 (learning performance) or C5 (level of aspiration behavior).
   2. Reinforcement orientation: D, D1 and D2.

B. Effects of the subject variables on (a) learning performance and (b) level of aspiration behavior.

   1. Levels: B, B1 through B4.
   2. Placement type: relative responses of the B1 and B4 subjects.
   3. Sex: S, S1 and S2.

C. Interaction effect of the reinforcement variables on (a) learning performance and (b) level of aspiration behavior.

   1. Reinforcement type-frequency X reinforcement orientation: DC, D1C1 through D2C6 or D2C5.

D. Interaction effects of the subject variables on (a) learning performance and (b) level of aspiration behavior.

   1. Levels x placement type: consistency of the relationships between the B1 subjects and the B2 and B3 subjects and the relationships between the B4 subjects and the B2 and B3 subjects.
   2. Levels X sex: BS, B1S1 through B4S2.
   3. Placement type X sex: consistency of the relationship between the S1 subjects and the S2 subjects within the B1 group and the relationship between the S1 subjects and the S2 subjects within the B4 group.

E. Interaction effects of the reinforcement and subject variables on (a) learning performance and (b) level of aspiration behavior.

   1. Reinforcement type-frequency X levels: C within B and BC, B1C1 through B4C6 or B4C5.
   2. Reinforcement orientation X levels: D within B and BD, B1D1 through B4D2.
   3. Reinforcement type-frequency X placement type: relative effect of the C variable on the responses of the B1 and B4 subjects.
   4. Reinforcement orientation X placement type: relative effect of the D variable on the responses of the B1 and B4 subjects.
   5. Reinforcement type-frequency X sex: SC, S1C1 through S2C6 or S2C5.
   6. Reinforcement orientation X sex: SD, S1D1 through S2D2

F. Interaction effects of the reinforcement and task variables on (a) learning performance and (b) level of aspiration behavior.

   1. Reinforcement type-frequency X tasks: consistency of relationships pertaining to the C variable over the six tasks.
   2. Reinforcement orientation X tasks: consistency of relationships pertaining to the D variable over the six tasks.

G. Interaction effects of the subject and task variables on (a) learning performance and (b) level of aspiration behavior.

   1. Levels X tasks: consistency of relationships pertaining to the B variable over the six tasks.
   2. Placement type X tasks: consistency of relationships between the B1 and B4 groups over the six tasks.
   3. Sex X tasks: consistency of relationships pertaining to the S variable over the six tasks.

Summary of Statistical Data

The data presented in tabular form in Chapter III are organized in this section in terms of the objectives cited in Chapter I as following from the purpose of the investigation. The format used relevant to each objective includes these facets: statement of major trends apparent in the data; citation of the original tabular locations of the data; presentation of results of generalized comparisons; and specification of discrepancies from the major trends noted.

Effects of the Reinforcement Variables on Learning Performance

Reinforcement Type-frequency

Although differences occurred, generally, the reinforcement type-frequency variable did not affect the attainment time and number of responses scores consistently. Relevant evidence is in Table 162. With four exceptions probabilities greater than .01 were associated with the F-ratios yielded by the analyses of covariance applied to each of the two response measures at the four practice levels. The four exceptions where differences occurred were these: attainment time scores at the third and fourth practice levels of the DLN and number of responses scores at the third and fourth practice levels of the CFV. Paired comparisons revealed the following specific relationships.

1. DLN, third practice level. The 100% failure (C4) group had a lower mean attainment time than the level of aspiration control (C5) and the speed and accuracy control (C6) groups. All other means were equivalent.

2. DLN, fourth practice level. The 100% failure (C4) group had a lower mean attainment time than the 100% success (C1) group, the 66% success--33% failure (C2) group, the level of aspiration control (C5) group, and the speed and accuracy control (C6) group. All other means were equivalent.

3. CFV, third practice level. The 66% success--33% failure (C2) group had a higher mean number of responsesscore than the 100% success (C1) group and the speed and accuracy control (C6) group. All other means were equivalent.

4. CFV, fourth practice level. The 66% success--33% failure (C2) group's mean number of responses score exceeded those of the other five groups--the 100% success (C1), the 66% failure--33% success (C3), the 100% failure (C4), the level of aspiration control (C5), and the speed and accuracy control (C6) groups. All other means were equivalent.

Table 162

Effect of Reinforcement Type-frequency (C) on Learning Performance

A. Probabilities of F-ratios Yielded by the Analyses of Covariance

Task		DLV	RLV	CFV	DLN	RLN	CFN
Source Table #		ACV: 8 MR: --	ACV: 60 MR: --	ACV: 111 MR: --	ACV: 35 MR: 36	ACV: 84 MR: --	ACV: 138 MR: --
Att. Time	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	<.01[a]	>.01	>.01
	A4	>.01	>.01	>.01	<.01[b]	>.01	>.01
Source Table #		ACV: 22 MR: --	ACV: 74 MR: --	ACV: 125 MR: 126			
#R	A1	>.01	>.01	>.01			
	A2	>.01	>.01	>.01			
	A3	>.01	>.01	<.01[c]			
	A4	>.01	>.01	<.01[d]			

B. Directions of Relationships Revealed by the Multiple Range Tests

a) C4<C5, C4<C6; all other means were equivalent.
b) C1>C4, C2>C4, C4<C5, C4<C6; all other means were equivalent.
c) C1<C2, C2>C6; all other means were equivalent.
d) C1<C2, C2>C3, C2>C4, C2>C5, C2>C6; all other means were equivalent.

Reinforcement Orientation

The reinforcement orientation variable did not affect the attainment time and number of responses scores. Pertinent data are in Table 163. In no comparison, did probabilities less than .01 result from the analyses of covariance of the two response measures at the four practice levels.

Table 163

Effect of Reinforcement Orientation (D) on Learning Performance

A. Probabilities of F-ratios Yielded by Analyses of Covariance

Task		DLV	RLV	CFV	DLN	RLN	CFN
Source Table #		ACV: 8 MR: --	ACV: 60 MR: --	ACV: 111 MR: --	ACV: 35 MR: --	ACV: 84 MR: --	ACV: 138 MR: --
Att. Time	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 22 MR: --	ACV: 74 MR: --	ACV: 125 MR: --			
#R	A1	>.01	>.01	>.01			
	A2	>.01	>.01	>.01			
	A3	>.01	>.01	>.01			
	A4	>.01	>.01	>.01			

Effects of the Subject
Variables on Learning Performance

Levels

Levels tended to affect learning performance. The data in Table 164 reveal that in every comparison of attainment time scores, except at the first practice level of the CFN, the F-ratios were associated with probability levels smaller than .01. Paired comparisons of attainment time scores revealed the following relationships.

1. DLV, first, second, and fourth practice levels. The institutionalized retarded (B4) group had lower means than the other three grou the non-institutionalized retarded (B1), the normal (B2), and the superior (B3). All other means were equivalent.

2. DLV, third practice level. The institutionalized retarded (B4) group had a lower mean than the normal (B2) and superior (B3) groups. The other groups' means were equivalent.

3. RLV, first and second practice levels. The normal (B2) and superior (B3) groups' means were lower than those of the non-institutionalize retarded (B1) group. All other means were equivalent.

4. RLV, third and fourth practice levels. The superior (B3) group's means were lower than those of the non-institutionalized retarded (B1) and normal (B2) groups. All other means were equivalent.

5. CFV, first, third, and fourth practice levels. The superior (B3) group had lower means than the non-institutionalized retarded (B1) and institutionalized retarded (B4) groups. The non-institutionalized retarded (B1) subjects' means exceeded those of the normal (B2) subjects. All other means were equivalent.

6. CFV, second practice level. The normal (B2) and superior (B3) subjects had lower means than the non-institutionalized retarded (B1) and institutionalized retarded (B4) subjects. All other means were equivalent.

7. DLN, first practice level. The non-institutionalized retarded (B1) and institutionalized retarded (B4) groups had lower means than the normal (B2) and superior (B3) groups. Also, the superior (B3) subjects' mean exceeded that of the normal (B2) subjects. The two retarded (B1 and B4) groups had equivalent means.

8. DLN, second, third, and fourth practice levels. The non-institutionalized retarded (B1) and institutionalized retarded (B4) groups had lower means than the normal (B2) and superior (B3) groups. All other means were equivalent.

9. RLN, first and second practice levels. The superior (B3) group's means exceeded those of the non-institutionalized retarded (B1), the institutionalized retarded (B4), and the normal (B2) groups. All other means were equivalent.

10. RLN, third and fourth practice levels. The normal (B2) and superior (B3) subjects' means were larger than those of the non-institutionalized retarded (B1) and the institutionalized retarded (B4) subjects. Also, the normal (B2) group had lower means than the superior (B3) group. The two retarded groups (B1 and B4) had equivalent means.

11. CFN, second practice level. The superior (B3) group had a higher mean than either the non-institutionalized (B1) or the institutionalized (B4) retarded groups. All other means were equivalent.

12. CFN, third and fourth practice levels. The normal (B2) and superior (B3) groups had higher means than the non-institutionalized retarded (B1) and institutionalized retarded (B4) groups. Also, the superior (B3) group's means exceeded those of the normal (B2) group. No other differences occurred.

Placement Type

The placement type variable did not tend to affect consistently the attainment time scores. The evidence for this statement appears in Table 164. In all but one comparison, the non-institutionalized retarded (B1) and the institutionalized retarded (B4) groups had equivalent means. The exception occurred on the DLV task. Paired comparisons revealed the following relationships.

1. DLV, second and fourth practice levels. The non-institutionalized retarded (B1) group had higher means than the institutionalized retarded (B4) group.

Table 164

Effect of the Levels (B) on Learning Performance

A. Probabilities of F-ratios Yielded by Analyses of Covariance

Task		DLV	RLV	CFV	DLN	RLN	CFN
Source Table #		ACV: 19 MR: 20	ACV: 71 MR: 72	ACV: 122 MR: 123	ACV: 47 MR: 48	ACV: 98 MR: 99	ACV: 151 MR: 152
Att. Time	A1	<.001[a]	<.001[e]	<.001[i]	<.001[m]	<.001[q]	>.01
	A2	<.001[b]	<.001[f]	<.001[j]	<.001[n]	<.001[r]	<.001[u]
	A3	<.01[c]	<.001[g]	<.001[k]	<.001[o]	<.001[s]	<.001[v]
	A4	<.001[d]	<.001[h]	<.001[l]	<.001[p]	<.001[t]	<.001[w]

B. Directions of Relationships Revealed by the Multiple Range Tests

a) B1>B4, B2>B4, B3>B4; all other means were equivalent.
b) B1>B4, B2>B4, B3>B4; all other means were equivalent.
c) B2>B4, B3>B4; all other means were equivalent.
d) B1>B4, B2>B4, B3>B4; all other means were equivalent.
e) B1>B2, B1>B3, B2=B3.
f) B1>B2, B1>B3, B2=B3.
g) B1>B2, B1>B3, B2>B3.
h) B1>B2, B1>B3, B2>B3.
i) B1>B2, B1>B3 B3<B4; all other means were equivalent.
j) B1>B2, B1>B3, B2<B4, B3<B4; all other means were equivalent.
k) B1>B2, B1>B3, B3<B4: all other means were equivalent.
l) B1>B2, B1>B3, B3<B4; all other means were equivalent.
m) B1<B2, B1<B3, B2<B3, B2>B4, B3>B4, B1=B4.
n) B1<B2, B1<B3, B2>B4, B3>B4; all other means were equivalent.
o) B1<B2, B1<B3, B2>B4, B3>B4; all other means were equivalent.
p) B1<B2, B1<B3, B2>B4, B3>B4; all other means were equivalent.
q) B1<B3, B2<B3, B3>B4; all other means were equivalent.
r) B1<B3, B2<B3, B3>B4; all other means were equivalent.
s) B1<B2, B1<B3, B2<B3, B2>B4, B3>B4, B1=B4.
t) B1<B2, B1<B3, B2<B3, B2>B4, B3>B4, B1=B4.
u) B1<B3, B3>B4; all other means were equivalent.
v) B1<B2, B1<B3, B2<B3, B2>B4, B3>B4, B1=B4.
w) B1<B2, B1<B3, B2<B3, B2>B4, B3>B4, B1=B4.

Sex

The sex variable did not tend to affect the number of responses scores consistently. The relevant data are in Table 165. With one exception, the probability levels at which the F-ratios occurred were greater than .01. The one exception was on the CFV. A paired comparison revealed the following relationship.

Table 165

Effect of Sex (S) on Learning Performance

A. Probabilities of F-ratios Yielded by the Analyses of Covariance

Task		DLV	RLV	CFV
Source Table #		ACV: 22 MR: --	ACV: 74 MR: --	ACV: 125 MR: 126
#R	A1	>.01	>.01	>.01
	A2	>.01	>.01	>.01
	A3	>.01	>.01	<.01[a]
	A4	>.01	>.01	>.01

B. Direction of the Relationship Revealed by the Multiple Range Test

a) S1>S2

1. CFV, third practice level. The boys (S1) had a higher mean number of responses score than the girls (S2).

Interaction Effect of the Reinforcement Variables on Learning Performance

The reinforcement type-frequency and orientation variables did not interact to affect the number of responses scores.

Table 166 contains the relevant evidence. All of the F-ratios yielded by the several analyses of covariance occurred at probability levels greater than .01. This might be expected since the corresponding single factors were not associated with significant F-ratios.

Table 166

Interaction Effect of Reinforcement Type-Frequency and Reinforcement Orientation (CD) on Learning Performance

A. Probabilities of F-ratios Yielded by the Analyses of Covariance

Task		DLV	RLV	CFV
Source Table #		ACV: 22 MR: --	ACV: 4 MR: --	ACV: 125 MR: --
#R	A1	>.01	>.01	>.01
	A2	>.01	>.01	>.01
	A3	>.01	>.01	>.01
	A4	>.01	>.01	>.01

Interaction Effects of the Subject Variables on Learning Performance

Levels X Placement Type

The placement type and levels variables did not interact to affect the attainment time scores. Data in Table 164 are relevant. With one exception, consistent patterns of relationships were present between the two retarded groups and the normal and superior groups. That is, paired comparisons revealed the following specific relationships.

1. DLV, first, second, third, and fourth practice levels. The institutionalized retarded (B4) group had lower means for attainment time than the non-institutionalized retarded (B1), the normal (B2), and the superior (B3) groups. The institutionalized retarded (B1), the normal (B2), and the superior (B3) groups had equivalent means.

Levels X Sex

The levels and sex variables did not interact to affect the number of responses scores. The information in Table 167 reveals that all F-ratios occurred at probability levels greater than .01.

Placement Type X Sex

The placement type and sex variables did not interact to affect the number of responses scores. The data listed in Table 167 pertain here. All F-ratios were associated with probability levels greater than .01.

Table 167

Interaction Effect of Levels and Sex (BS) on Learning Performance

A. Probabilities of the F-ratios Yielded by the Analyses of Covariance

Task		DLV	RLV	CFV
Source Table #		ACV: 22 MR: --	ACV: 74 MR: --	ACV: 125 MR: --
#R	A1	>.01	>.01	>.01
	A2	>.01	>.01	>.01
	A3	>.01	>.01	>.01
	A4	>.01	>.01	>.01

Interaction Effects of the Reinforcement and Subject Variables on Learning Performance

Reinforcement Type-Frequency X Levels

The reinforcement type-frequency and levels variables did not interact to affect the attainment time and number of responses scores. Table 168 includes data which indicate that the pertinent F-ratios were not significant.

Reinforcement Orientation X Levels

Although some differences occurred, generally, no consistent interaction was evident between the reinforcement orientation and levels variables. Table 169 contains germane data. These data reveal that non-significant F-ratios were associated with the interaction factor in all cases except eight. These eight exceptions are described in the following list.

1. RLV, second practice level. The superior (B3) subjects receiving the individual orientation (D1) had a lower mean than those receiving the group orientation (D2).

2. RLV, third and fourth practice levels. Non-institutionalized retarded (B1) subjects receiving the individual orientation (D1) had lower means than those receiving the group orientation (D2).

3. RLN, first and second practice levels. The normal (B2) subjects receiving the individual orientation (D1) had lower means than those receiving the group orientation (D2).

4. RLN, fourth practice level. The non-institutionalized retarded (B1) subjects receiving the individual orientation (D1) had a higher mean than those receiving the group orientation (D2).

Table 168

Interaction Effect of Reinforcement Type-frequency and Levels (BC) on Learning Performance

A. Probabilities of F-ratios Yielded by the Analyses of Covariance.

Task		DLV	RLV	CFV	DLN	RLN	CFN
Source Table #		ACV: 11 MR: --	ACV: 63 MR: --	ACV: 114 MR: --	ACV: 38 MR: --	ACV: 87 MR: 88	ACV: 141 MR: 142
Att. Time Within B1	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 13 MR: --	ACV: 66 MR: --	ACV: 116 MR: --	ACV: 40 MR: --	ACV: 90 MR: --	ACV: 144 MR: --
Att. Time Within B2	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 15 MR: --	ACV: 68 MR: --	ACV: 118 MR: --	ACV: 43 MR: --	ACV: 93 MR: --	ACV: 146 MR: --
Att. Time Within B3	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 17 MR: --	ACV: --- MR: --	ACV: 120 MR: --	ACV: 45 MR: --	ACV: 95 MR: --	ACV: 148 MR: --
Att. Time Within B4	A1	>.01	---	>.01	>.01	>.01	>.01
	A2	>.01	---	>.01	>.01	>.01	>.01
	A3	>.01	---	>.01	>.01	>.01	>.01
	A4	>.01	---	>.01	>.01	>.01	>.01
Source Table #		ACV: 22 MR: --	ACV: 74 MR: --	ACV: 125 MR: --			
[illegible]	A1	>.01	>.01	>.01			
	A2	>.01	>.01	>.01			
	A3	>.01	>.01	>.01			
	A4	>.01	>.01	>.01			

5. DLN, third and fourth practice levels. Within the normal (B2) group, those receiving the individual orientation (D1) had higher means than those receiving the group orientation (D2).

6. In all other comparisons than those cited above, the means were equivalent.

Reinforcement Type-frequency X Placement Type

The reinforcement type-frequency and placement type variables did not interact to affect the number of responses and attainment time scores. The data in Table 168 reveal that the non-institutionalized retarded (B1) and the institutionalized retarded (B4) groups responded in the same fashion to the several sets of type-frequency information.

Reinforcement Orientation X Placement Type

The placement type and orientation variables did not interact to affect the attainment time and number of responses scores consistently. Contained in Table 169 is information indicating that the non-institutionalized (B1) and institutionalized (B4) retarded groups generally responded in similar fashion to the two reinforcement orientations in the several comparisons. The means of subjects receiving the individual (D1) and group (D2) orientations within both levels groups were equivalent. One exception was on the RLN task. Paired comparisons revealed the following relationship.

1. RLN, fourth practice level. The non-institutionalized retarded (B1) subjects receiving the individual orientation (D1) had a higher mean than those receiving the group orientation (D2). These means were equivalent within the institutionalized retarded (B4) group.

Reinforcement Type-frequency X Sex

The sex and reinforcement type-frequency variables did not interact to affect the number of responses scores.

Table 169

Interaction Effect of Reinforcement Orientation and Levels (BD) on Learning Performance

A. Probabilities of F-ratios Yielded by the Analyses of Covariance

Task		DLV	RLV	CFV	DLN	RLN	CFN
Source Table #		ACV: 11 MR: --	ACV: 63 MR: 64	ACV: 114 MR: --	ACV: 38 MR: --	ACV: 87 MR: 88	ACV: 141 MR: --
Att. Time Within B1	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	<.01[a]	>.01	>.01	>.01	>.01
	A4	>.01	<.001[b]	>.01	>.01	<.01[c]	>.01
Source Table #		ACV: 13 MR: --	ACV: 66 MR: --	ACV: 116 MR: --	ACV: 40 MR: 41	ACV: 90 MR: 91	ACV: 144 MR: --
Att. Time Within B2	A1	>.01	>.01	>.01	>.01	<.01[f]	>.01
	A2	>.01	>.01	>.01	>.01	<.01[g]	>.01
	A3	>.01	>.01	>.01	<.01[d]	>.01	.01
	A4	>.01	>.01	>.01	<.01[e]	>.01	>.01
Source Table #		ACV: 15 MR: --	ACV: 68 MR: 69	ACV: 118 MR: --	ACV: 43 MR: --	ACV: 93 MR: --	ACV: 146 MR: --
Att. Time Within B3	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	<.01[h]	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 17 MR: --	ACV: --- MR: --	ACV: 120 MR: --	ACV: 45 MR: --	ACV: 95 MR: --	ACV: 148 MR: --
Att. Time Within B4	A1	>.01	---	>.01	>.01	>.01	>.01
	A2	>.01	---	>.01	>.01	>.01	>.01
	A3	>.01	---	>.01	>.01	>.01	>.01
	A4	>.01	---	>.01	>.01	>.01	>.01

(N.B. Table continued on next page.)

Table 169 (Continued)

Task		DLV	RLV	CFV
Source Table #		ACV: 22 MR: --	ACV: 74 MR: --	ACV: 125 MR: --
#R	A1	>.01	>.01	>.01
	A2	>.01	>.01	>.01
	A3	>.01	>.01	>.01
	A4	>.01	>.01	>.01

B. Directions of Relationships Revealed by the Multiple Range Tests

a) D1<D2
b) D1<D2
c) D1>D2
d) D1>D2
e) D1>D2
f) D1<D2
g) D1<D2
h) D1<D2

Table 170 consists of data germane to this statement. None of the F-ratios associated with the SC factor occurred at a probability level less than .01.

Table 170

Effect of Reinforcement Type-frequency and Sex (CS) on Learning Performance

A. Probabilities of F-ratios Yielded by Analyses of Covariance

Task		DLV	RLV	CFV
Source Table #		ACV: 22 MR: --	ACV: 71 MR: --	ACV: 125 MR: --
#R	A1	>.01	>.01	>.01
	A2	>.01	>.01	>.01
	A3	>.01	>.01	>.01
	A4	>.01	>.01	>.01

Interaction Effects of the Reinforcement and Task Variables on Learning Performance

Reinforcement Type-frequency X Tasks

Some differences occurred; nevertheless, the reinforcement type-frequency and task variables generally did not interact to affect the attainment time and number of responses scores. Table 162 contains information which pertains here. For the most part, the subjects receiving the several sets of type-frequency information responded in a consistent fashion to tasks differentiated according to level of complexity and extent of verbalization involved. Exceptions to this were at the third and fourth practice levels of the DLN (attainment time) and the CFV (number of responses scores). Paired comparisons revealed the following specific relationships.

1. DLN, third practice level. The 100% failure (C4) subjects tended to have a lower mean attainment time score than the level of aspiration control (C5) and speed and accuracy control (C6) subjects. All other means were equivalent.
2. DLN, fourth practice level. The 100% failure (C4) group had a lower attainment time mean than the 100% success (C1), 66% success--33% failure (C2), level of aspiration control (C5), and speed and accuracy control (C6) groups. All other means were equivalent.
3. CFV, third and fourth practice levels. The 66% success--33% failure (C2) group had a higher mean number of responses score than the 100% success (C1) and speed and accuracy control (C6) groups. All other means were equivalent.

Reinforcement Orientation X Tasks

The reinforcement orientation and task variables did not interact to affect the attainment time and number of responses scores. Table 163 contains data which reveal that perfect consistency is evident in the performance of subjects who received the different orientations on the several tasks.

Interaction Effects of the Subject and Task Variables on Learning Performance

Levels X Tasks

There was some interaction effect of the levels and task variables on the attainment time scores. Pertinent evidence appears in Table 164. The relationship between the several pairs of groups differed, to some extent, among tasks which were varied in terms of level of complexity and extent of verbalization. For the verbal tasks, the paired comparisons revealed the following specific relationships.

1. DLV, all four practice levels. With one exception, the institutionalized retarded (B4) group had lower attainment time means than the other three groups. The non-institutionalized retarded (B1), normal (B2), and superior (B3) groups' means were equivalent.

The exception was that the two retarded (B1 and B4) groups had equivalent means at the third practice level.

2. RLV, all four practice levels. The non-institutionalized retarded (B1) subjects had higher means than the normal (B2) and superior (B3) subjects for the attainment time scores. Also, the normal (B2) group had higher attainment time means than the superior (B3) group at the third and fourth practice levels. All other means were equivalent.

3. CFV, all four practice levels. The two retarded (B1 and B4) groups' attainment time means tended to exceed those of the normal (B2) and superior (B3) groups, while the latter groups had equivalent means. All other means were equivalent.

For the non-verbal tasks, the paired comparisons revealed the following specific relationshsips.

1. DLN, RLN, CFN, all practice levels excepting the first practice level of the CFN where all means were equivalent. In all instances, the superior (B3) group had higher attainment time means than the two retarded (B1 and B4) groups, while the latter groups had equivalent means. Also, with the exception of the second practice level on the RLN and CFN, the normal (B2) subjects had higher means than the non-institutionalized retarded (B1) subjects. In most other instances, the normal (B2) subjects' means exceeded those of the institutionalized retarded (B4) subjects, while they were lower than those of the superior (B3) subjects.

Placement Type X Tasks

In general, the placement type and task variables did not interact to affect the attainment time scores. Table 164 contains data which are pertinent. With one exception, the institutionalized retarded (B4) and the non-institutionalized retarded (B1) groups had equivalent means. Paired comparisons revealed the following relationships.

1. DLV, first, second, and fourth practice levels. The institutionalized retarded (B4) subjects had lower means for the attainment time scores than the non-institutionalized retarded (B1) subjects.

Sex X Tasks

The sex and task variables did not interact to affect the number of response scores consistently. The evidence in Table 165 indicates that, generally, the males and females responded in the same fashion to the six tasks: with the exception of the third practice level of the CFV task, null relationships were extant. A paired comparison revealed the following relationship.

1. CFV, third practice level. The males (S1) had a higher mean than the females (S2).

Effects of the Reinforcement Variables on the Goal Discrepancy Scores

Reinforcement Type-frequency

In some comparisons, the 100% failure (C4) and the level of aspiration control (C5) groups had larger means than the other groups and in some comparisons they had smaller means; however, in the majority of cases the reinforcement type-frequency variable did not affect the sizes of the absolute, positive, and negative goal discrepancy scores. Data in Table 171 are germane. The F-ratios yielded by 59 of the 72 comparisons occurred at probability levels greater than .01. In the thirteen instances where significant F-ratios were obtained, paired comparisons revealed the following relationships.

1. CFV, second practice level. The 100% success (C1) group had a lower mean positive goal discrepancy score than the 66% failure--33% success (C3) and 100% failure (C4) groups. All other means were equivalent.

2. CFV, third practice level. On the absolute goal discrepancy scores, the 100% failure (C4) group had a higher mean than the 100% success (C1), 66% success--33% failure (C2), and level of aspiration control (C5) groups. All other means were equivalent. On the positive goal discrepancy scores, the 100% success (C1) group had a lower mean than the 66% failure--33% success (C3), 100% failure (C4), and level of aspiration control (C5) groups. All other means were equivalent.

3. DLN, second practice level. On the absolute goal discrepancy scores, th level of aspiration control (C5) group had a higher mean than the 100% success (C1) and 66% success--33% failure (C2) groups. All other means were equivalent.

4. DLN, third practice level. The level of aspiration control (C3) group's absolute goal discrepancy score mean was higher than those of the 100% success (C1) and 66% success--33% failure (C2) groups. Also, the 66% success--33% failure (C2) group had a lower mean than the 100% failure (C4) group. All other means were equivalent.

5. DLN, fourth practice level. On both absolute and positive goal discrepancy scores, the level of aspiration control (C5) group had a higher mean than the 100% success (C1), 66% success--33% failure (C2), 66% failure--33% success (C3), and 100% failure (C4) groups. All other means were equivalent.

Table 171

Effect of Reinforcement Type-frequency (C) on the Absolute, Positive and Negative Goal Discrepancy Scores

A. Probabilities of F-ratios Yielded by the Analyses of Covariance

Task		DLV	RLV	CFV	DLN	RLN	CFN
Source Table #		ACV: 25 MR: --	ACV: 77 MR: --	ACV: 128 MR: 129	ACV: 50 MR: 51	ACV: 101 MR: 102	ACV: 154 MR: 155
G.D. Ab.	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	<.01[b]	<.001[e]	>.01
	A3	>.01	>.01	<.01[a]	<.001[c]	<.001[f]	<.001[g]
	A4	>.01	>.01	>.01	<.001[d]	>.01	>.01
Source Table #		ACV: 28 MR: --	ACV: 79 MR: --	ACV: 131 MR: 132	ACV: 53 MR: 54	ACV: 104 MR: 105	ACV: 157 MR: --
G.D. +	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	<.01[h]	>.01	<.01[k]	>.01
	A3	>.01	>.01	<.001[i]	>.01	>.01	>.01
	A4	>.01	>.01	>.01	<.001[j]	>.01	>.01
Source Table #		ACV: 31 MR: --	ACV: 81 MR: --	ACV: 134 MR: --	ACV: 56 MR: --	ACV: 107 MR: 108	ACV: 159 MR: 160
G.D. -	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	<.001[l]	<.01[m]
	A4	>.01	>.01	>.01	>.01	>.01	>.01

B. Directions of Relationships Revealed by the Multiple Range Tests

a) C1<C4, C2<C4, C4>C5; all other means were equivalent.
b) C1<C5, C2<C5; all other means were equivalent.
c) C1<C5, C2<C4, C2<C5; all other means were equivalent.
d) C1<C5, C2<C5, C3<C5, C4<C5; all other means were equivalent.
e) C1<C4, C1<C5, C2<C5; all other means were equivalent.
f) C1<C4, C2<C4, C3<C4, C4>C5; all other means were equivalent.
g) C1<C4, C2<C4, C3<C4, C4>C5; all other means were equivalent.
h) C1<C3, C1<C4; all other means were equivalent.
i) C1<C3, C1<C4, C1<C5; all other means were equivalent.
j) C1<C5, C2<C5, C3<C5, C4<C5; all other means were equivalent.
k) C1<C4, C1<C5; all other means were equivalent.
l) C1>C4, C2>C4, C4<C5; all other means were equivalent.
m) C1>C4, C2>C4, C4<C5; all other means were equivalent.

6. RLN, second practice level. The 100% success (C1) group had a lower mean than the 100% failure (C4) and level of aspiration control (C5) groups on both the absolute and positive goal discrepancy scores. On the absolute goal discrepancy scores, the 66% success--33% failure (C2) group had a lower mean than the level of aspiration control (C5) group. All other means were equivalent.

7. RLN, third practice level. On the absolute goal discrepancy scores, the 100% failure (C4) group had a higher mean than the 100% success (C1), 66% success--33% failure (C2), 66% failure--33% success (C3), and level of aspiration control (C5) groups. On the negative goal discrepancy scores, the 100% failure (C4) group had a lower mean than the 100% success (C1), 66% success--33% failure (C2), and level of aspiration control (C5) groups. All other means were equivalent.

8. CFN, third practice level. On the absolute goal discrepancy scores, the 100% failure (C4) group had a higher mean than the 100% success (C1), 66% success--33% failure (C2), 66% failure--33% success (C3), and level of aspiration control (C5) groups. On the negative discrepancy scores, the 100% success (C1), 66% success--33% failure (C2), and level of aspiration control (C5) groups had higher means than the 100% failure (C4) group. All other means were equivalent.

Reinforcement Orientation

The reinforcement orientation variable did not affect the absolute, positive, and negative goal discrepancy scores. The data in Table 172 reveal that no F-ratio was associated with a probability level less than .01.

Effects of the Subject Variables on the Goal Discrepancy Scores

Levels

Levels did not affect the sizes of the absolute, positive, and negative goal discrepancy scores. In Table 173 are presented the relevant data. No F-ratio was associated with a probability level of .01 or less.

Placement Type

The placement type variable did not affect the absolute, positive, and negative goal discrepancy scores. The data in Table 173 indicate that the analyses of the levels factor yielded F-ratios associated with probability levels greater than .01. It follows that the non-institutionalized retarded (B1) and institutionalized retarded (B4) groups had equivalent means.

Table 172

Effect of Reinforcement Orientation (D) on the Absolute, Positive, and Negative Goal Discrepancy Scores

A. Probabilities of F-ratios Yielded by the Analyses of Covariance

Task		DLV	RLV	CFV	DLN	RLN	CFN
Source Table #		ACV: 25 MR: --	ACV: 77 MR: --	ACV: 128 MR: --	ACV: 50 MR: --	ACV: 101 MR: --	ACV: 154 MR: --
G.D. Ab.	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 28 MR: --	ACV: 79 MR: --	ACV: 131 MR: --	ACV: 53 MR: --	ACV: 104 MR: --	ACV: 157 MR: --
G.D. +	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 31 MR: --	ACV: 81 MR: --	ACV: 134 MR: --	ACV: 56 MR: --	ACV: 107 MR: --	ACV: 159 MR: --
G.D. -	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01

Table 173

Effect of Levels (B) on the Absolute, Positive, and Negative Goal Discrepancy Scores

A. Probabilities of F-ratios Yielded by the Analyses of Covariance

Task		DLV	RLV	CFV	DLN	RLN	CFN
Source Table #		ACV: 25 MR: --	ACV: 77 MR: --	ACV: 128 MR: --	ACV: 50 MR: --	ACV: 101 MR: --	ACV: 154 MR: --
G.D. Ab.	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 28 MR: --	ACV: 79 MR: --	ACV: 131 MR: --	ACV: 53 MR: --	ACV: 104 MR: --	ACV: 157 MR: --
G.D. +	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 31 MR: --	ACV: 81 MR: --	ACV: 134 MR: --	ACV: 56 MR: --	ACV: 107 MR: --	ACV: 159 MR: --
G.D. -	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01

Sex

The sex variable did not affect the absolute, positive, or negative goal discrepancy scores. Table 174 contains data which reveal that probability levels greater than .01 were associated with all F-ratios.

Table 174

Effect of Sex (S) on Absolute, Positive, and Negative Goal Discrepancy Scores

A. Probabilities of F-ratios Yielded by the Analyses of Covariance

Task		DLV	RLV	CFV	DLN	RLN	CFN
Source Table #		ACV: 25 MR: --	ACV: 77 MR: --	ACV: 128 MR: --	ACV: 50 MR: --	ACV: 101 MR: --	ACV: 154 MR: --
G.D. Ab.	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 28 MR: --	ACV: 79 MR: --	ACV: 131 MR: --	ACV: 53 MR: --	ACV: 104 MR: --	ACV: 157 MR: --
G.D. +	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 31 MR: --	ACV: 81 MR: --	ACV: 134 MR: --	ACV: 56 MR: --	ACV: 107 MR: --	ACV: 159 MR: --
G.D. -	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01

Interaction Effect of the Reinforcement Type-frequency and Orientation Variables on the Goal Discrepancy Scores

Although differences occurred in isolated comparisons, generally the reinforcement type-frequency and orientation variables did not interact consistently to affect the absolute, positive, and negative goal discrepancy scores. Table 175 includes pertinent data. With several exceptions, the

Table 175

Interaction Effect of Reinforcement Type-frequency and Orientation (DC) on the Absolute, Positive, and Negative Goal Discrepancy Scores

A. Probabilities of F-ratios Yielded by the Analyses of Covariance

Task		DLV	RLV	CFV	DLN	RLN	CFN
Source Table #		ACV: 25 MR: --	ACV: 77 MR: --	ACV: 128 MR: --	ACV: 50 MR: --	ACV: 101 MR: 102	ACV: 154 MR: --
G.D. Ab.	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	<.01[a]	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 28 MR: --	ACV: 79 MR: --	ACV: 131 MR: --	ACV: 53 MR: --	ACV: 104 MR: --	ACV: 157 MR: --
G.D. +	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 31 MR: 32	ACV: 81 MR: --	ACV: 134 MR: --	ACV: 56 MR: 57	ACV: 107 Mr: 108	ACV: 159 MR: --
G.D. -	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	<.01[b]	>.01	>.01	<.01[c]	>.01	>.01
	A3	>.01	>.01	>.01	>.01	<.01[d]	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01

B. Directions of Relationships Revealed by the Multiple Range Tests

a) D1: C3<C4, C4>C5; all other means were equivalent.
   D2: C3>C4, C4<C5; all other means were equivalent.
b) D1: C2>C4, C4<C5; all other means were equivalent.
   D2: C2<C4, C4>C5; all other means were equivalent.
c) D1: C3>C4; all other means were equivalent.
   D2: C3<C5; all other means were equivalent.
d) D1: C3>C4; all other means were equivalent.
   D2: C3<C4; all other means were equivalent.

F-ratios were associated with probability levels greater than .01. Paired comparisons revealed the following specific relationships.

1. DLV, second practice level. On negative goal discrepancy scores the 100% failure (C4) group receiving the individual orientation (D1)

had a lower mean than the 66% success--33% failure (C2) and level of aspiration control (C5) groups. The 100% failure (C4) group receiving the group orientation (D2) had a higher mean than the 66% success--33% failure (C2) and level of aspiration control (C5) groups. All other means were equivalent.

2. DLN, second practice level. On negative goal discrepancy scores: subjects receiving the individual orientation (D1) in combination with 100% failure (C4) information had a lower mean than those receiving 66% failure--33% success (C3) information; subjects receiving the group orientation in combination with 66% failure--33% success (C3) information had a lower mean than those receiving level of aspiration control (C5) information.
3. RLN, third practice level. The 100% failure (C4) group receiving the individual orientation (D1) had a higher mean for the absolute goal discrepancy scores than the 66% failure--33% success (C3) group and the level of aspiration control (C5) group. For the negative goal discrepancy scores the 33% failure--66% success (C3) group receiving the individual orientation (D1) had a higher mean than the 100% failure (C4) group. Opposite results occurred for subjects receiving the group orientation (D2).
4. In all other comparisons than those cited above the means were equivalent.

Interaction Effects of the Subject Variables on the Goal Discrepancy Scores

Levels X Placement Type

The levels and placement type variables did not interact to affect the sizes of the absolute, positive, and negative goal discrepancy scores. Table 173 contains data indicating that the several levels groups had equivalent goal discrepancy scores of the various types; thus, the relationship between the means of the non-institutionalized retarded (B1) and the normal (B2) and superior (B3) groups was similar to the relationship between the means of the institutionalized retarded (B4) and the normal (B2) and superior (B3) groups.

Levels X Sex

The levels and sex variables did not interact to affect the sizes of the absolute, positive, and negative goal discrepancy scores. The evidence in Table 176 reveals that no F-ratio was associated with a probability level smaller than .01.

Table 176

Interaction Effect of Levels and Sex (BS) on the Absolute, Positive, and Negative Goal Discrepancy Scores

A. Probabilities of F-ratios Yielded by the Analyses of Covariance

Task		DLV	RLV	CFV	DLN	RLN	CFN
Source Table #		ACV: 25 MR: --	ACV: 77 MR: --	ACV: 128 MR: --	ACV: 50 MR: --	ACV: 101 MR: --	ACV: 154 MR: --
G.D. Ab.	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 28 MR: --	ACV: 79 MR: --	ACV: 131 MR: --	ACV: 53 MR: --	ACV: 104 MR: --	ACV: 157 MR: --
G.D. +	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 31 MR: --	ACV: 81 MR: --	ACV: 134 MR: --	ACV: 56 MR: --	ACV: 107 MR: --	ACV: 159 MR: --
G.D. -	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01

Sex X Placement Type

The sex and placement type variables did not interact to affect the sizes of the absolute, positive, and negative goal discrepancy scores. Table 176 includes data which reveal that the males and females in both the non-institutionalized retarded (B1) and the institutionalized retarded (B4) groups had equivalent means.

Interaction Effects of the Reinforcement and Subject Variables on the Goal Discrepancy Scores

Reinforcement Type-frequency X Levels

Some differences were present; nevertheless, the reinforcement type-frequency and levels variables did not interact consistently to affect the absolute, positive, and negative goal discrepancy scores. Relevant data are in Table 177. Excepting two comparisons, the several F-ratios occurred at probability levels greater than .01. The two exceptions involved the negative goal discrepancy scores. Paired comparisons revealed that the following relationships obtained.

1. CPV, first practice level. On negative goal discrepancy scores, the superior (B3) subjects in the 66% success--33% failure (C2) group had a lower mean than those in the 100% success (C1), 66% failure--33% success (C3), 100% failure (C4), and level of aspiration control (C5) groups. All other means were equivalent.
2. DLN, second practice level. On negative goal discrepancy scores, the normal (B2) subjects in the level of aspiration control (C5) group had a higher mean than the 100% success (C1) and 66% failure--33% success (C3) groups. The superior (B3) subjects in the level of aspiration control (C5) group had a lower mean than the 100% success (C1), the 66% success--33% failure (C2), the 66% failure--33% success (C3), and 100% failure (C4) groups. The institutionalized retarded (B4) subjects in the 100% failure (C4) group had a lower mean than those in the 66% failure--33% success (C3) group. All other means were equivalent.

Reinforcement Orientation X Levels

The reinforcement orientation and levels variables did not interact to affect the absolute, positive, and negative goal discrepancy scores. The data in Table 178 reveal that no F-ratio occurred at a probability level less than .01.

Reinforcement Type-frequency X Placement Type

The placement type and reinforcement type-frequency vaiables did not interact consistently to affect the sizes of the absolute, positive, and negative goal discrepancy scores. The data in Table 177 reveal that in only one case did the reinforcement type-frequency subgroups within the institutionalized retarded (B1) and the non-institutionalized retarded (B4) groups differ in terms of sizes of goal discrepancy scores. Paired comparisons revealed the following specific relationship.

Table 177

Interaction Effect of Reinforcement Type-frequency and Levels (BC) Absolute, Positive, and Negative Goal Discrepancy Scores

A. Probabilities of F-ratios Yielded by the Analyses of Covariance

Task		DLN	RLV	CFV	DLN	RLN	CFN
Source Table #		ACV: 25 MR: --	ACV: 77 MR: --	ACV: 128 MR: --	ACV: 50 MR: --	ACV: 101 MR: --	ACV: 154 MR: --
G.D. Ab.	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 28 MR: --	ACV: 79 MR: --	ACV: 131 MR: --	ACV: 53 MR: --	ACV: 104 MR: --	ACV: 157 MR: --
G.D. +	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 31 MR: --	ACV: 81 MR: --	ACV: 134 MR: 135	ACV: 56 MR: 57	ACV: 107 MR: --	ACV: 159 MR: --
G.D. -	A1	>.01	>.01	<.001[a]	>.01	>.01	>.01
	A2	>.01	>.01	>.01	<.001[b]	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01

B. Direction of the Relationship Revealed by the Multiple Range-Test

a) B1: All means were equivalent.
B2: All means were equivalent.
B3: C1>C2, C2<C3, C2<C4, C2<C5; all other means were equivalent.
B4: All means were equivalent.

b) B1: All means were equivalent.
B2: C1<C5, C3<C5; all other means were equivalent.
B3: C1>C5, C2>C5, C3>C5, C4>C5; all other means were equivalent.
B4: C3>C4, all other means were equivalent.

1. At the second practice level of the DLN, the mean negative goal discrepancy scores of the 33% success--66% failure (C3) subjects within the institutionalized retarded (B4) group was larger than that of the corresponding 100% failure (C4) subjects. No differences between these groups occurred within the non-institutionalized retarded (B1) group.

Table 178

Interaction Effect of Reinforcement Orientation and Levels (BD) on the Absolute, Positive, and Negative Goal Discrepancy Scores

A. Probabilities of F-ratios Yielded by the Analyses of Covariance

Task		DLV	RLV	CFV	DLN	RLN	CFN
Source Table #		ACV: 25 MR: --	ACV: 77 MR: --	ACV: 128 MR: --	ACV: 50 MR: --	ACV: 101 MR: --	ACV: 154 MR: --
G.D. Ab.	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 28 MR: --	ACV: 79 MR: --	ACV: 131 MR: --	ACV: 53 MR: --	ACV: 104 MR: --	ACV: 157 MR: --
G.D. +	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 31 MR: --	ACV: 81 MR: --	ACV: 134 MR: --	ACV: 56 MR: --	ACV: 107 MR: --	ACV: 159 MR: --
G.D. -	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01

Reinforcement Orientation X Placement Type

The placement type and reinforcement orientation variables did not interact to affect the sizes of the absolute, positive, and negative goal discrepancy scores. Table 178 includes data indicating that within both the non-institutionalized retarded (B1) and the institutionalized retarded (B4) groups the several orientation (D) groups had equivalent means.

Reinforcement Type-frequency X Sex

The reinforcement type-frequency and sex variables did not interact consistently to affect the sizes of the absolute, positive, and negative goal discrepancy scores. Pertinent evidence appears in Table 179. All except one F-ratio occurred at probability levels greater than .01. The one exception was at the second practice level of the DLV; this exception involved the positive goal discrepancy scores. Here, paired comparisons revealed the following relationships.

Table 179

Interaction Effect of Reinforcement Type-frequency and Sex (SC) on the Absolute, Positive, and Negative Goal Discrepancy Scores

A. Probabilities of F-ratios Yielded by the Analyses of Covariance

Task		DLV	RLV	CFV	DLN	RLN	CFN
Source Table #		ACV: 25 MR: --	ACV: 77 MR: --	ACV: 128 MR: --	ACV: 50 MR: --	ACV: 101 MR: --	ACV: 154 MR: --
G.D. Ab.	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 28 MR: 29	ACV: 79 MR: --	ACV: 131 MR: --	ACV: 53 MR: --	ACV: 104 MR: --	ACV. 157 MR: --
G.D. +	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	<.01[a]	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 31 MR: --	ACV: 81 MR: --	ACV: 134 MR: --	ACV: 56 MR: --	ACV: 107 MR: --	ACV: 159 MR: --
G.D. -	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01

B. Directions of Relationships Revealed by the Multiple Range Tests

a) S1: C1<C5, C2<C5, C3<C5; all other means were equivalent
S2: C1>C5, C2>C5, C3>C5; all other means were equivalent.

1. DLV, second practice level. The males (S1) in the level of aspiration control (C5) group had a higher mean than the males in the 100% success (C1), 66% success--33% failure (C2), and the 66% failure--33% success (C3) groups. The relationships among the means of the females receiving the several type-frequency sets of information were opposite to these relationships shown by the males. All other means were equivalent.

Reinforcement Orientation X Sex

The reinforcement orientation and sex variables did not interact consistently to affect the sizes of the absolute, positive, and negative goal discrepancy scores. Table 180 contains pertinent evidence. With one exception, the several F-ratios occurred at probability levels greater than .01. The one exception was at the second practice level of the negative goal discrepancy scores on the DLV. Paired comparisons revealed the following relationship.

1. DLV, second practice level. The males (S1) receiving the group orientation (D2) had a higher mean than the females (S2) receiving the group orientation. The males and females receiving the individual orientation (D1) had equivalent means.

Interaction Effects of the Reinforcement and Task Variables on the Goal Discrepancy Scores

Reinforcement Type-frequency X Tasks

Although there was a slight trend, the reinforcement type-frequency and task variables did not interact consistently to affect the sizes of the absolute, positive, and negative goal discrepancy scores. The data in Table 171 constitute pertinent evidence. In 13 out of 24 comparisons, the F-ratios were significant. Inspection of the directions of the differences involved revealed the following relationships.

1. CFV, second and third practice levels. The 100% success (C1) group's mean absolute and positive goal discrepancy scores were lower than those of the other type-frequency groups. Also, the 100% failure (C4) group's mean absolute goal discrepancy score was higher than the means on the 66% success--33% failure (C2) and level of aspiration control (C5) groups. All other means were equivalent.

2. DLN, second, third, and fourth practice levels. At the second and third practice levels, the level of aspiration control (C5) group had a larger mean absolute goal discrepancy score than either the 100% success (C1) or the 66% success--33% failure (C2) group. At the fourth practice level, the level of aspiration control group's mean was higher than those of all the other type-frequency (C1, C2, C3, C4) groups. At the third practice level, the 100% failure (C4) group had a higher mean than the 66% success--33% failure (C2) group. All other means were equivalent.

3. RLN, second and third practice levels. The 100% failure (C4) group tended to have higner means than the other groups on absolute and positive goal discrepancy scores and lower means on negative goal discrepancy scores. Also, the level of aspiration control (C5) group's mean absolute goal discrepancy score was higher at the second practice level than that of the 100% success (C1) group. All other means were equivalent.

Table 180

Interaction Effect of Reinforcement Orientation and Sex (SD) on the Absolute, Positive, and Negative Goal Discrepancy Scores

A. Probabilities of F-ratios Yielded by the Analyses of Covariance

Task		DLV	RLV	CFV	DLN	RLN	CFN
Source Table #		ACV: 25 MR: --	ACV: 77 MR: --	ACV: 128 MR: --	ACV: 50 MR: --	ACV: 101 MR: --	ACV: 154 MR: --
G.D. Ab.	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 28 MR: --	ACV: 79 MR: --	ACV: 131 MR: --	ACV: 53 MR: --	ACV: 104 MR: --	ACV: 157 MR: --
G.D. +	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	>.01	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01
Source Table #		ACV: 31 MR: 32	ACV: 81 MR: --	ACV: 134 MR: --	ACV: 56 MR: --	ACV: 107 MR: --	ACV: 159 MR: --
G.D. -	A1	>.01	>.01	>.01	>.01	>.01	>.01
	A2	<.01[a]	>.01	>.01	>.01	>.01	>.01
	A3	>.01	>.01	>.01	>.01	>.01	>.01
	A4	>.01	>.01	>.01	>.01	>.01	>.01

B. Directions of the Relationship Revealed by the Multiple Range Test

a) D1: S1=S2
D2: S1>S2

Reinforcement Orientation X Tasks

The reinforcement orientation and task variables did not interact to affect the sizes of the absolute, positive, and negative goal discrepancy scores. The data in Table 172 indicate that for all six tasks the subjects in the two orientation groups responded in a similar fashion.

Interaction Effects of the Subject and Task Variables on the Goal Discrepancy Scores

Levels X Tasks

The levels and the task variables did not interact to affect the sizes of the absolute, positive, and negative goal discrepancy scores. In Table 173 are data which reveal that the levels groups had equivalent goal discrepancy scores on the several tasks.

Placement Type X Tasks

The placement type and the task variables did not interact to affect the sizes of the absolute, positive, and negative goal discrepancy scores. Data cited in the immediately preceding section are germane here (Table 173). Since the four levels groups responded similarly on the six tasks, it follows that the non-institutionalized retarded (B1) and the institutionalized retarded (B4)groups had equivalent mean goal discrepancy scores.

Sex X Tasks

The sex and task variables did not interact to affect the sizes of the absolute, positive, and negative goal discrepancy scores. Table 174 contains relevant data. The males and females had equivalent means in all pertinent comparisons.

Effects and Interaction Effects of the Reinforcement, Subject, and Task Variables on the Directions of Goal Changes After Success and Failure

In some comparisons differences occurred; on the whole however, the reinforcement, subject, and task variables singly did not affect, or interact to affect, consistently the directions in which subjects changed their goals after success or failure (Table 181).

Table 181

Effects and Interaction Effects of the Reinforcement, Subject, and Task Variables on the Directions of Goal Changes After Success or Failure

Comparison[a] (All B and D Classifications)	DLV, RLV, CFV	DLN, RLN, CFN	Number of Critical Ratios Occurring at p <.01					
	Trial No.	Trial No.	SR	SL	SNC	FR	FL	FNC
C1, C2, C5	9, 10, 17, 18	3, 4, 11, 12	0	0	0			
C3, C4, C5	9, 10, 17, 18	3, 4, 11, 12				0	1[d]	0
C1,C2,C3,C5	11, 14, 15, 19	5, 8, 9, 13	1[b]	0	0			
C2,C3,C4,C5	12, 13, 16, 20	6, 7, 10, 14				0	1[e]	0
C1,C2,C3,C4,C5	21, 22, 23	15, 16, 17	1[c]	0	0			

a) N.B.: For each of the C groups listed, subgroups involving the B and D classifications were compared; and so, a much larger number of comparisons was made than ostensibly is present here at first glance

b) RLN, Trial 13, SR: B2D2C3<B1D2C1, B2D1C1, B4D1C1, B4D2C1, and B4D2C2 (Table 109).

c) RLN, Trial 15, SR: B1D2C3<B1D1C1, B1D2C1, B2D1C1, B2D2C2, B4D2C1, and B4D2C2 (Table 109).

d) CFV, Trial 17, FL: B2D1C4<B4D1C2 (Table 136).

e) CFV, Trial 13, FL: B2D1C4<B1D2C2, B3D1C2, B3D1C4, and B4D2C2 (Table 136).

The data in Table 181 indicate that with several exceptions the majority of subjects in the several groups raised their goals after success and lowered them after failure. The exceptions were the following.

1. RLN, Trial 13. Normal subjects who received 33% success--66% failure with the group orientation (B2D2C3) raised their goals after success less frequently than the following levels groups who received the indicated reinforcement combinations: non-institutionalized retarded subjects, 100% success with the group orientation (B1D2C1); normal subjects, 100% success with the individual orientation (B2D1C1; institutionalized retarded subjects, 100% success with the individual orientation (B4D1C1), 100% success with the group orientation (B4D2C1), and 66% success --33% failure with the group orientation (B4D2C2).

2. RLN, Trial 15. Non-institutionalized retarded subjects who received 33% success--66% failure with the group orientation (B1D2C3) raised their goals after success less frequently than the following levels groups who received the indicated reinforcement combinations: non-institutionalized retarded subjects, 100% success with the

individual orientation (B1D1C1), and 100% success with the group orientation (B1D2C1); normal subjects, 100% success with the individual orientation (B2D1C1) and 66% success--33% failure with the group orientation (B2D2C2); institutionalized retarded subjects, 100% success with the group orientation (B4D2C1) and 66% success--33% failure with the group orientation (B4D2C2).

3. CFV, Trial 17. Normal subjects who received 100% failure with the individual orientation (B2D1C4) lowered their goals after failure less frequently than the institutionalized retarded subjects who received 33% success--66% failure with the individual orientation (B4D1C3).

4. CFV, Trial 13. Normal subjects who received 100% failure with the individual orientation (B2D1C4) lowered their goals after failure less frequently than the following levels groups who received the indicated reinforcement combinations: non-institutionalized retarded subjects, 66% success--33% failure with the group orientation (B1D2C2); superior subjects, 66% success--33% failure with the individual orientation (B3D1C2),and 100% failure with the individual orientation (B3D1C4); institutionalized retarded subjects, 66% success--33% failure with the group orientation (B4D2C2).

Discussion

Several issues implicit in the data cited above merit special discussion. These several issues may be reduced to five topics: (1) effects on learning performance and level of aspiration behavior of the reinforcement variables considered singly, in combination with each other, and in combination with the subject and task variables; (2) effects on level of aspiration behavior of the subject variables considered singly, in combination with each other, and in combination with the task variables; (3) effects on learning performance of the subject variables considered singly and in combination with the task variables; (4) responses of the retarded subjects to the reinforcement variables; and (5) effects on learning performance and level of aspiration behavior of the placement type variable considered singly and in combination with the reinforcement variables. The format used below for discussing each topic is the following: reference to previous investigations or articles pertinent to the issue; summary of relationships emanating from data obtained in the present investigation; delineation of discrepancies between previously published and presently obtained information; proposal of explanatory factors for these discrepancies; and statement of conclusions.

The first topic identified for special discussion is this: effects on learning performance and level of aspiration behavior of the reinforcement variables considered singly, in combination with each other, and in combination with the subject and task variables. Previous research germane to this topic includes investigations in the following areas: effects of praise and reproof on learning and task performance; effects of competition on learning and task performance; effects of success and failure on learning and task performance; effects of goal setting on task performance; effects of reinforcement variables on level of aspiration behavior; interaction effects of reinforcement variables and chronological age on learning performance and level of aspiration behavior; interaction effects of reinforcement variables and intelligence level on learning performance and level of aspiration behavior; and interaction effects of reinforcement variables and academic achievement level on level of aspiration behavior.

Evidence yielded by analyses of data obtained in the present study related to the effects and interaction effect of the reinforcement variables, and the interaction effects of these and the levels and task variables on learning performance and level of aspiration behavior revealed these relationships. Although differences occurred in specific comparisons, the reinforcement variables considered singly or in combination generally did not affect learning performance or level of aspiration behavior consistently; nor, did they interact with the task or subject variables to affect learning performance and level of aspiration behavior consistently.

In essence, results obtained in this study differed from those obtained by investigators who reported the following: control subjects performed less adequately than subjects who received praise or reproof--Benton (1936), Forlano and Axelrod (1937), Gilchrist (1916), Grace (1948), and Hurlock (1924; 1925); control subjects performed less adequately than subjects who received success or failure information--Anderson (1936), Anderson and Smith (1933), and Chase (1932); control subjects performed less adequately than subjects who received competition sets--Brown (1932), Chapman and Feder (1917), deWeerdt (1927), Kirby (1913), Leuba (1933), Maller (1929), Panlasigui and Knight (1930), Triplett (1898), and Zubin (1932); control subjects performed less adequately than subjects who set goals--Anderson and Brandt (1939); subjects who received variants of types of reinforcement information differed in performance or level of aspiration behavior--Forlano and Axelrod (1937), Hurlock (1925), Jucknat (1937), Maller (1929), Sorokin, et.al. (1930), and Thompson and Hunnicutt (1944); subjects who differed in intelligence or related variables differed in response to these aspects of reinforcement--Hurlock (1924), Sears (1940), and Sullivan (1927). Results obtained herein are consistent with those obtained by investigators who reported that no differences occurred in the treatment- control or in the treatment -treatment comparisons cited above (Benton, 1936; Brenner, 1934; Fitzgerald, 1951; Forlano, 1932; Forlano and Axelrod, 1937; Gilchrist, 1916; Grace, 1948; Hurlock, 1924; 1925; Sherman and Bell, 1951; Schmidt, 1941; Uematsu, 1956; and Walter and Marzolf, 1951).

Insofar as these discrepant results are concerned, several procedural variations may be suggested as possible explanatory factors.[1] These pertain to the following: characteristics of the reinforcement information; aspects of the task situation; nature of the control groups; and factors related to the administration of the task such as type of administrators used, location and nature of the subject-administrator contacts, and timing.

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[1] The aspects of procedure to be discussed were present, to some extent in several studies in which the results were inconsistent with those reported here; but, apparently, they did not operate to produce different relationships.

The first explanatory factor pertains to the characteristics of the reinforcement information. Perhaps the reinforcement information employed in the present investigation was not strong enough, and related to this, possibly the reinforcement information was not realistic in terms of performance. Yet, some evidence contradictory to this idea is available. When the comments made in this study and those made in many other studies employing children as subjects are compared, one set of comments does not appear particularly stronger than another. In addition, data associated with the level of aspiration responses indicated two relationships which are pertinent here. First, for the groups as a whole, the goal discrepancy scores were small; _i.e._, the subjects tended to set their goals relatively close to their reported performance levels. Second, the majority of times, after success the subjects tended to raise their goals and after failure they tended to lower them. If the subjects had not accepted the situations as _bona fide_ ones, then these relationships probably would not have been apparent. Further, observational evidence may be cited. In many cases, when subjects received failure information, especially repeated failure information, they manifested overt verbal and bodily expressions which might be interpreted as indicating concern. In many situations, when they received success information, the converse was apparent. This behavior was marked.

The second explanatory factor pertains to aspects of the task situation. First, the tasks possibly were not sensitive enough in that the response measures may not have reflected differences which really existed in the subjects' behavior. Yet, ostensibly, they were of the same type generally as those used by other investigators. In addition, both attainment times and number of responses scores were employed to reflect learning performance; the three types of goal discrepancy scores and the frequencies reflecting directions of goal changes were used to reflect level of aspiration behavior. These several scores were recorded in the event that some response measures might be more susceptible than others in terms of sensitivity to behavioral changes. Second, since several tasks were administered, and thus the subjects served under several combinations of reinforcement variants, the reinforcement information generally may have become ineffective with repetition. The points cited relevant to the strength and reality of the reinforcement information pertain here. And, in most cases, a reasonable period of time intervened between the administration of tasks. Moreover, if this argument were valid, the subjects' responses on the RLN but not on the remaining five tasks might have been affected because the RLN was administered to almost all of the subjects initially and then the remaining tasks were administered in an irregular order. However, the subjects' learning performance and level of aspiration behavior on the RLN did not appear to be affected by the reinforcement variables to a greater extent than their learning performance and level of aspiration behavior on the other tasks.

The third explanatory factor pertains to the nature of the control groups. Performance information was administered to the control groups in the present investigation. Such a procedure was not followed in many of the other studies. Perhaps, this knowledge of results served as implicit recognition of success or failure and thus operated as reinforcement information which was as effective as the investigators' comments about success and failure to the treatment groups. On the other hand, control subjects in other studies who received no performance information may not have received such implicit reinforcement and, consequently, may have performed less adequately than subjects to whom reinforcement information was administered as part of the experimental procedure. When the procedures were being planned for the present study, this administration of performance information to control subjects was recognized as a major methodological variation; nevertheless, information about responses of subjects operating without knowledge about their performance was not considered of practical concern in this study.

Several additional factors pertain to the administration of the tasks and the reinforcement variants. These include type of administrators, location and nature of the subject--administrator contacts, and timing. The type of administrator may have been influential. The tasks and reinforcement information were administered by outsiders: *i.e.*, persons with whom the subjects did not have consistent daily contact and/or who did not have a definitely defined public school role as far as the subjects perceived the situation. This might have operated to attenuate the subjects' reactions to the reinforcement information. However, the points made about the realism of the situation for the subjects may be cited again. And, in most of the other studies, outside investigators rather than classroom teachers or similar personnel presented the situation to the subjects. Also, several investigators reported evidence that the use of different people to administer the reinforcement information did not influence its effect systematically or consistently (Anderson, 1936; Anderson and Smith, 1933; Chase, 1932; Schmidt, 1941; and Triplett, 1898).

The role of the location and nature of the subject--administrator contacts needs to be considered. Subjects were dealt with individually instead of in groups and the location of the contact was a separate room in the school rather than the subjects' classrooms. These factors may have affected the extent to which the subjects responded to the reinforcement information. On the other hand, the procedure involved a test-like situation and school-like material. These procedural aspects, in turn, would seem to increase the seriousness with which the subjects viewed the situation.

Another, and an especially important, explanatory factor related to administration is the time factor. The evidence presented in this study pertains to immediate, short term administration of reinforcement information. This also was the case for most of the other investigations in this area. Still, reinforcement information of the several kinds administered continously over a more extended period of time perhaps would have different effects (Hurlock, 1925; Thompson, 1952).

Evaluating the several explanatory factors cited above is difficult; more investigation is needed. Until data from such further study are available, the following statement would seem applicable. Success and failure and different competition sets may influence subjects' responses; yet, this did not happen under the conditions of the present study. The consistency of the data obtained herein with those obtained in certain other studies and several practical considerations serve as bases for maintaining that the procedures used herein were valid ones, were taken seriously by the subjects, and were suitable to isolate differences if differences were going to occur. Accordingly, at the present time, the following conclusions seem reasonable. Subjects who receive different aspects of reinforcement information singly or in combination do not differ in learning performance or level of aspiration behavior. Subjects who differ in terms of intelligence level and, it is assumed, history of academic success and failure do not differ in their responses to the several reinforcement variables insofar as these responses are reflected by learning performance and level of aspiration behavior. Also, insofar as learning performance and level of aspiration behavior are concerne subjects react to the reinforcement variables in a similar fashion when they are administered during response to verbal and non-verbal tasks dimensionaliz according to complexity.

The second topic identified for special discussion is this: effects on level of aspiration behavior of the subject variables considered singly, in combination with each other, and in combination with the task variables. Previous research on this topic includes those aspects of Sears' (1940; 1941)

Uematsu's (1956), and Walter's and Marzolf's (1951) investigations germane to the relationship between academic achievement status and level of aspiration behavior.

The following relationships were suggested by data accrued in the present study. Although isolated differences occurred, on the whole, the subject variables considered singly or in combination did not affect level of aspiration behavior consistently; further, they did not interact with the task variables to affect level of aspiration behavior.

The data indicating that the levels variable did not affect the goal discrepancy scores are consistent with results reported by Uematsu and by Walter and Marzolf and inconsistent with comments made by Sears. Differences among criteria for selecting subjects and differences among tasks contribute as explanatory factors to understanding these discrepancies among results. However, before considering these points, reiterating aspects of the several investigations would be helpful.

Uematsu and Walter and Marzolf evaluated the relationship between subjects' academic achievement test scores and their absolute goal discrepancy scores. Respectively, the level of aspiration tasks employed were the addition of columns of inverted numbers and the Rotter Aspiration Board. In each study, the subjects generally were selected from a cross section of the school population. In neither study was a significant relationship isolated between the academic achievement and level of aspiration measures. Sears' subjects were chosen specifically on the basis of their school histories of success and/or failure in reading and/or arithmetic, and they set goals germane to performance on reading and arithmetic tasks. In a neutral condition (no experimentally manipulated success or failure), her total success and total failure groups differed in terms of positive and negative goal discrepancy scores pertaining to reading achievement and did not differ in terms of positive and negative goal discrepancy scores pertaining to arithmetic achievement. On the other hand, the goal discrepancy scores of her differential group (success in reading--failure in arithmetic) did not differ from those of either of the other two groups on either task.

The first explanatory factor pertains to criteria for subject selection. Range, or homogeneity--heterogeneity, of scores can be an important factor in identifying non-null relationships. On the academic achievement variable, the ranges of scores made by Uematsu's and Walter's and Marzolf's subjects probably were not as extensive as those made by Sears' subjects for whom this was a selection variable. On the other hand, in the present study, the subjects differed markedly in terms of the selection variable, intelligence, and as it happened, to some extent, in terms of reading achievement (Blake, 1959). Consequently, contradictions are apparent here, and with the limited data available assessing the importance of this subject selection factor is difficult.

The second explanatory factor related to differences among tasks. A more obvious, and perhaps more crucial, point to be considered in attempting to resolve this problem of inconsistent results is this: the goals set by Sears' subjects were for tasks reflecting the specific areas in which they had experienced previous success or failure; this was not the case in present investigation or in Uematsu's or Walter's and Marzolf's investigations. Implied here is a specificity of the effects of previous experience of success or failure[1]: viz., that attitudes related to success or failure experiences influence performance only in those situations in which the success or failure occurred and do not generalize to other situations. Yet, the observation that Sears' total success and total failure groups were similar in terms of goal discrepancy scores related to an arithmetic task and that neither of these groups varied on either task from the differential group complicates the specificity suggestion. Another possiblity is that, perhaps, a relationship exists between generalized feelings of success or failure and goal setting behavior for only certain tasks. Such a possibility involves this argument. Successful reading achievement in this culture receives a great deal of attention and emphasis; for arithmetic, such attention and emphasis might not have existed in the late 1930's when Sears' work probably was done. Granting this, Sears' failure group may have been more concerned about a reading task than about an arithmetic task and consequently were disturbed in setting goals related thereto. Not inconsistent with this idea are these observations. Uematsu's subjects[2] did not differ in terms of goal discrepancy scores related to an arithmetic type task. Walter and Marzolf's subjects did not differ in goal discrepancy scores related to the Rotter Aspiration Board. In the present study, subjects did not differ in goal discrepancy scores related to tasks which, while they certainly involved some elements of reading and arithmetic performance, ostensibly did not involve reading and arithmetic as they commonly are encountered in the classroom by pupils in the chronological age groups sampled. On the other hand, inconsistent with this aspect of the specificity suggestion is the observation that Sears' differential group did not vary from her other two groups insofar as their goal discrepancy scores were concerned. If the differential group had generalized feelings of success, they should have differed from the failure group; conversely, if they had generalized feelings of failure, they should have differed from the success group. Perhaps, they had intermediate feelings of success or failure and goal discrepancy scores within the intermediate range and Sears' statistical tests simply were not sufficiently powerful to detect more intermediate differences which might have existed. There is not enough evidence to decide which of these possibilities is tenable. The results of Lent's (1959) work apply to this problem. He compared the level of aspiration responses of mentally retarded subjects enrolled in special classes with those of mentally retarded subjects enrolled in non-special classes. He considered these groups of subjects to be dissimilar in terms of previous and current experiences of success or failure. On both an arithmetic type task and a reading type task, his subjects did not differ in terms of the indices of level of aspiration behavior he employed.

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[1] See Lewin, et. al. (1944) for a discussion of the the theoretical aspects of the generality hypothesis and for a review of pertinent investigations.

[2] However, Uematsu employed post World War II Japanese children as subjects and the role of the cultural factor here is unknown.

In general, subjects who differ in terms of previous experiences related to success or failure may vary in response to activities which involve setting goals; this is reasonable to expect. However, the preponderance of evidence so far accrued in investigations in which children were employed as subjects does not substantiate such an expectation. Admittedly, research pertaining to the topic has limitations and more investigation is needed; on the other hand, consistency is apparent among results of several investigations. And so, at the present time, bases exist for concluding that subjects who vary in terms of intelligence level and history of academic adequacy do not differ in level of aspiration behavior related to a number of tasks.

The third topic identified for special discussion is this: effects on learning performance of the subject variables considered singly and in combination with the task variables. Previous work on this topic appeared in several investigations (Cassell, 1957; Colvin, 1915; Johnson and Blake, 1960; Stevenson and Isco, 1954; Woodrow, 1917).

Data obtained in the present study indicated the following. To a great extent, the levels variable affected learning performance and interacted with the task variables to affect learning performance. These data are consistent with data presented by the investigators cited above. These investigators reported that older retarded subjects performed more adequately on tasks in which motor manipulation was at a maximum and overt manipulation of verbal symbols was at a minimum, while younger normal subjects who had similar mental ages performed more adequately on tasks which involved primarily verbal learning of paired associate nonsense syllables. In addition, in the present study, younger more intelligent subjects performed more adequately on tasks which tapped verbal concept formation; this point has been unclear in the past. There has been a dearth of information about the relative responses of superior and normal subjects and superior and retarded subjects. Also, no previous statistical evidence was located about the relative responses of the several groups to discrimination learning tasks.

The obtained data supported the idea that some relationship was present between the levels variable and learning performance. The task characteristics were influential in this relationship; *i.e.*, the levels variable interacted with the task variables. The levels variable involved dimensionalizing intelligence and chronological age; concomitant to these are several subject characteristics. Two task characteristics were varied: complexity and the extent to which primarily overt verbal or non-verbal responses were required. The evidence suggested the following. On the non-verbal tasks, a highly positive relationship existed between chronological age and performance adequacy; intelligence level and task complexity did not appear influential. On all three tasks involving primarily non-verbal, motor responses, the older retarded subjects performed more adequately than the younger normal subjects, and both groups performed more adequately than the still younger superior subjects. Conversely, on the verbal tasks, chronological age did not appear to be operant; instead, some positive relationship seemed to be present between intelligence level and task complexity. On the discrimination learning task, the three groups performed with equivalent adequacy; on the rote learning and concept formation tasks, the retarded groups performed less adequately than the normal and superior groups who, in turn, performed with similar adequacy. These results are not inconsistent with past work pertinent to the topic, nor, to some extent, with evidence related to psychometric and achievement test performance. Nevertheless, several limitations or problems must be suggested. These are inherent in considerations related to the nature of the task materials and the activities involved in manipulating these: *to wit*, degree of difficulty involved, degree to which trial and error processes were employed, extent to which language was used, etc. These points are discussed below.

On the non-verbal tasks, chronological age rather than intelligence level was the more influential subject variable and the task characteristic, complexity, did not affect this relationship. As stated, this is not inconsistent with other evidence on the matter; however, generalization must be restricted. Still unknown is whether similar results would be obtained if other systems of dimensionalizing tasks according to complexity were used, if the tasks were more difficult, if the tasks involved more of the cognitive element, and/or if the subjects were required to search for correct responses by trial and error rather than to respond motorically while having a demonstration of the correct responses to rely upon. These problems require further investigation.

On the verbal tasks, the relationship between task complexity and intelligence level tended to be influential in performance to some extent. Yet, to determine what factor associated with intelligence level was important is difficult. Three factors--intellectual power, anxiety level, and language facility--might have been operant.

That brightness or intellectual power per se was paramount is questionable because the normal and superior subjects did not differ from each other in terms of learning performance. The influence of intellectual power might have been more obvious if the tasks had been more difficult or if a different system of dimensionalizing according to complexity had been used. Deciding this without further evidence is impossible.

Anxiety level is another explanatory factor. Bijou (1952), Cameron and Magaret (1951), and Sarason and Galdwin (1961), among others, contended that in test situations, especially those involving verbal materials, retarded subjects, who often have had past experiences of difficulty and failure in such situations, possibly experience anxiety related to anticipation of failure which might be detrimental to their performance while normal and superior subjects, who often have not had such failure experiences, do not succumb to these dynamics. Nevertheless, data reflecting the effects of the reinforcement and placement variables indicated that when both institutionalized and non-institutionalized retarded subjects actually received failure information in the learning situation, their performance was not influenced detrimentally. They generally did not perform less adequately than they had been performing previously or less adequately than corresponding retarded subjects who did not receive failure information; nor, were they affected by failure any more than normal and superior subjects.

Consequently, the role of failure-related anxiety in retarded subjects' reactions cannot be given much weight insofar as the present data are concerned. However, the hypothesis is reasonable and it would bear further exploration.

Language facility could have been influential. In situations in which they responded to verbal materials in the rather simple discrimination learning situation, the retarded subjects performed as adequately as normal and superior subjects; on the other hand, when they had to employ verbal material in the relatively more complex rote learning and concept formation situations, they did not respond as adequately as normal and superior subjects. Perhaps, socioeconomic status through its effect on language development operated. However, the subjects were selected from the same geographical area and marked differences in socioeconomic status were not apparent. Yet, some related factor may have influenced verbal performance. Here again information is scarce and further study is needed.

Generally, the levels variable singly and in combination with the task variables affect learning performance to some extent. Factors which produce these differences, factors which would operate to produce larger differences, factors which would operate to produce smaller differences or similarities, factors which would operate to produce various patterns of differences--these all require further exploration.[1]

The fourth and fifth topics identified for special discussion can be considered best concomitantly. In essence, these topics relate to the influence of factors associated with mental retardation on intellectual and motivational behavior. Specifically, in the context of the present study, the topics are these: responses of retarded subjects to the reinforcement variables; and, effects on learning performance and level of aspiration behavior of the placement type variable considered singly and in combination with the reinforcement variables. The issues here also are material to problems discussed earlier relevant to the effect of the subject variables and interaction effects of the reinforcement and subject variables; also, explantory factors cited there are appropriate here and *vice versa*. In additon, several other factors are germane.

Several responses might be expected. If the retarded subjects were going to respond differentially to the reinforcement variables, then within both the institutionalized and non-institutionalized retarded groups, subjects receiving the various sets of reinforcement information would have differed from each other, from retarded subjects in control groups, and from normal and superior subjects. If institutionalized retarded and non-institutionalized retarded subjects were going to respond differently, they should have differed from each other as well as from the normal and superior subjects in the above situations and in the learning and level of aspiration situations in which the reinforcement variables were held constant.

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[1] Some of these factors currently are being examined in the third investigation (Blake, 1964) in the research program described in Chapter I.

The rationale for these expectations is based on factors related to retardation _per se_ and to factors related to institutionalization because of retardation. Scrutiny of these factors reveals that the dynamics are somewhat similar, with the issues involved being primarily a matter of degree. This rationale is outlined briefly below.

One idea was considered in the discussion of the effects and interaction effects of the levels and task variables on learning performance. This idea is the following: both institutionalized and non-institutionalized retarded subjects usually have a history of failure in school, school related activities, and test situations related thereto; consequently, they have relatively low tolerances for failure and experience in test or test-like situations, especially verbal ones, anxiety or other negative emotional reactions; these, in turn, may influence their performance in an inimical manner (Bijou, 1952; Cameron and Magaret, 1951; and Sarason and Gladwin, 1961). In addition, factors associated with the reason for institutionalization and with living within an institutional environment are considered to result in an emotional and intellectual climate which is not conducive to efficient learning and realistic motivational characteristics. This rationale is based on clinical observation of some retarded individuals and some indirect research data.[1] Several comments[2] by Sarason and Gladwin (1961) are illustrative.

> If one does not have to be mentally "normal" in order to fill an acceptable social role, what significance does the line dividing "subnormality" from "normality" really have? Certainly we would reject the suggestion that the jobs requiring lesser skills which these

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[1] _Supra_, p. 8.

[2] In the material cited, all parentheses, italics, and quotation marks are Sarason's and Gladwin's.

> people (along with many "normals") still are somehow fit only for outcasts in our society. It is in fact clear from the evidence presented that there is no criterion of culturally acceptable performance which most retarded individuals cannot meet, even if minimally, with one glaring exception. Were it not for this exception our society would probably have a problem of retardation little greater than that of the Hutterites or the Trukese. The exception is of course school performance, and the IQ concept which is a part of the same complex of standards and values.
>
> Because of the hurdle of school, when we think of retardation we think of retarded children, and rightly so because it is only at school age that prevalence rates reach alarming proportions. We have already discussed in this and the preceding section the various experiences and handicaps which a retarded child encounters in school under the screening of middle class criteria of behavior and performance. We do not need to repeat the discussion, and for our purposes here will only draw attention again to the emotional impact upon a child in his formative years of being segregated because of mental subnormality. Although we know very little about the nature and magnitude of this impact, it must be substantial, particularly in areas of motivation for initiative and ambition which are so vital to occupational and social success in our society. No amount of intelligent dedication on the part of teachers of special classes can erase the fact that their pupils have been declared unfit to participate with their peers in an activity which society inflexibly demands of all its members of a certain age.
>
> Worse off than those who are merely emotionally damaged by school failure are those who are institutionalized needlessly as a result of this failure. Happily, the proportion of subcultural or "garden variety" retarded children in institutions is constantly decreasing, for the great majority of these can be expected on the basis of our present knowledge to be able with some help to make an acceptable social adjustment if they are not kept too long in the institutional environment described earlier in this section. Quite probably some of the children with milder degrees of organic defect who now go to institutions could also make an acceptable social adjustment if they were pointed in this direction throughout the developmental years without regard to school standards. This is of course the objective of many special classes, but it is often implemented only after the child has tried and failed to cope with the normal curriculum, with all of the damaged hopes and disillusionment of parents and child that this implies (pp. 557-58).

In addition to these ideas, comments by Sarason and Gladwin quoted in Chapter I[1] are especially pertinent here. Part of this quotation is reiterated below.

> ... the bulk of the "high grade" cases in our institutional population differs in no fundamental respect from those we have called

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[1] *Supra*, pp. 8-9.

> mentally retarded.[1] Parental neglect or abuse which comes to the attention of authorities, delinquent behavior, aggressive display in the school situation, lack of adequate community facilities (*e.g.*, foster care, temporary shelters)--these are frequently the factors which determine whether or not a retarded child is likely to be institutionalized (p.626).

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> In an earlier paragraph we expressed the opinion that the bulk of the high grade cases in our institutions differed in no fundamental respect from those we have called mentally retarded but are not institutionalized. One could argue against such a conclusion on the grounds that the test scores of those institutionalized are probably significantly lower than the scores of those who are in the community and that such a difference may reflect a "basic" difference between the two groups. From all that we have said thus far in this report, it should be apparent that we do not think the grounds for such an argument are tenable.

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> Institutionalization involves *drastic* change for the individual and there is every reason for assuming that it is a stressful one involving (a) separation from loved or familiar figures, (b) pressures to adjust to a complete new physical and interpersonal (peer and adult) environment, (c) confusion and resentment about their helplessness, and (d) anxiety in relation to the future. In the case of the mentally retarded individual, who usually comes from an unfavorable family situation, we are usually struck by the material differences between home and institution. But this is the way *we* view the change and one should not assume, therefore, that the child perceives it the way we do. What to us is a psychologically unfavorable family situation, and what may even be an unpleasant one to the child, may in the process of institutionalization be perceived by the child as his only source of security. As important as the immediate effects are those of prolonged institutionalization. It is our clinical impression that the major effects of prolonged institutionalization are four-fold: (a) overt conformity to the institutional culture at the expense of personal spontaneity and expression, (b) excessive phantasying, especially about the "outside world", (c) avoidance and fear of new problem solving situations, and (d) excessive dependence on the institutional culture, which becomes apparent when the possibility of leaving the institution arises. The effects of institutionalization vary with age at commitment. In stressing the possible deleterious effects of institutionalization we are not unmindful that we are dealing with a very complex problem (pp. 626-627).

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[1] Label for ". . . that large group of individuals whose retardation is not associated with organic pathology and who are able, or could become able, to maintain themselves in the community" (Sarason and Gladwin, 1959, p.625).

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The data obtained in the present study indicate that consistent differences did not occur in the comparisons pertinent here. Generally, neither the institutionalized nor the non-institutionalized subjects responded differentially to the reinforcement variables. Within each retarded group, the subjects receiving the several frequencies of success or failure did not differ from one another nor did they differ from control subjects. The institutionalized retarded and non-institutionalized retarded subjects did not differ from each other or from normal and superior subjects in response to the reinforcement variables or in level of aspiration behavior when the reinforcement variables were held constant. In learning performance when the reinforcement variables were held constant, excepting DLV task performance, institutionalized and non-institutionalized subjects did not differ from each other and they differed in a similar fashion from normal and superior subjects.

These results are consistent with Sarason's and Gladwin's comments that institutionalized and non-institutionalized subjects are basically alike. They are inconsistent with the expectations outlined above, with Sarason's and Gladwin's comments that institutionalized and non-institutionalized subjects are affected by potentially harmful emotional influences, and with indirect research suggesting deleterious effects of institutionalization. Explanatory factors include those discussed earlier relevant to other issues: *i.e.*, characteristics of the reinforcement information, nature of the control groups, etc. In addition, several other explanatory factors bear citation. These factors relate to the following: attitudes of the subjects toward success and failure; actual capacities of the two retarded groups; length of institutionalization; and nature of the institutions from which the subjects were selected.

The attitudes of the subjects were possibly operant. No attempt was made in selecting either group of retarded subjects to locate individuals who did or did not have any particular attitudes toward success or failure, levels of anxiety, or levels of frustration tolerance; the only pertinent stipulation was that they have no emotional maladjustment which was sufficiently severe to interfere with response to the situations involved in the investigation. Subjects selected specifically on the basis of a criterion related to certain anxiety levels, certain frustration tolerance levels, and/or certain attitudes toward school, toward failure in school activities, toward special class placement, toward institutional placement, etc., might have reacted differently to the several situations involved herein than did the retarded subjects employed.

The actual capacities of the subjects could be important. An attempt was made to select institutionalized retarded subjects who were equivvalent to non-institutionalized retarded subjects in mental age, chronological age, intelligence quotient, and related characteristics. Various negative factors associated with institutionalization might have operated to produce a situation in which the institutionalized subjects' manifest capacities[1] were much lower in comparison to their basic capacities[2] than was the case for the non-institutionalized subjects. If this did occur, it could follow that, even though they did not appear to be so in intelligence test performance, the institutionalized subjects were more capable than the non-institutionalized subjects to such an extent that the possible deleterious effects of institutionalization were masked or counteracted as far as the situations involved in this study were concerned.

Length of institutionalization is relevant next. When institutionalized subjects were being selected, the only stipulation germane to length of institutionalization was that the subjects be those who had been institutionalized at least one year. The idea was to select subjects who could be expected to have had time to make an initial adjustment to institutional placement. Maybe the results would have varied if the length of institutionalization factor had been manipulated in another manner. For example, different results might have been obtained if selection had been restricted in such ways as these: to only subjects who had been institutionalized since infancy; to only subjects who had been institutionalized four or five years or a longer time; or to subjects who had been institutionalized less than one year.

The nature of the institutions involved also may be an important factor. The institutions from which the subjects were selected had a number of features such as psychological services, educational programs, colonies, etc. Perhaps, in the situations involved, these features precluded many of the anticipated deleterious or negative influences. Subjects from different types of institutions might have responded, in contrast to the institutionalized subjects used herein, in the expected manner.

Determining which of these, or other, explanatory factors were influential requires further research. Until such research is performed, it seems that here, as in the situations in which retarded subjects in special and non-special classes did not differ in various aspects of behavior (e.g., Ainsworth, 1959;

[1,2] See Newland (1955) for a discussion of basic capacity and manifest capacity and factors which can operate to produce a discrepancy between these two.

Cassidy, 1958; and Thurstone, 1959), there are at least two possibilities. First, logical as they are, the expectations may be untenable. Second, the expectations may be tenable but the research designed for their evaluation or confirmation may not include the right variables or the right techniques and procedures for assessing or manipulating these variables. Currently, in the absence of further data, the only comment which seems appropriate is this: both institutionalized and non-institutionalized retarded subjects may feel threatened in test or test-like situations--especially verbal ones in which they experience failure--and this perceived threat may affect their responses negatively; however, the subjects employed were not so affected in the situations used in this investigation.

Conclusions

In most cases, the relationships presented and discussed above were not without exception; nevertheless, major tendencies in the evidence support certain generalizations. Of course, these generalizations are limited to reinforcement, task, and subject variables, to procedures, and to response measures similar to those employed in this investigation. In this restriction special emphasis is given to the factors cited in the discussion above. These factors pertain to such issues as the following: characteristics of the reinforcement information; aspects of the task situation; kinds of control groups; conditions related to administering the task and the reinforcement information to the subjects; nature of the subjects' experiential backgrounds related to success and failure; attributes of the subjects' attitudes toward success and failure and toward institutionalization; length of the subjects' institutionalization; types of institutions from which the subjects were selected; etc.

With these restrictions noted and stressed, generalizations about learnin performance and level of aspiration behavior are presented below. For each dependent variable, these generalizations are organized in terms of the objectives which were cited in Chapter I and which were used above as the framework for summarizing relationships apparent in data located in Chapter III.

Learning Performance

The following generalizations are germane to learning performance as it is reflected by attainment time and number of responses scores.

Effects of the reinforcement variables on learning performance

1. Variations in reinforcement type-frequency do not affect learning performance. No differences occur in the learning performance of the following: subjects who set goals and receive several frequencies of success or failure information, subjects who set goals but receive only performance information, and subjects who do not set goals but receive only performance information.

2. Variations in reinforcement orientation do not affect learning performance. No differences occur in the learning performance of the following: subjects who set goals and receive success or failure information stated within the framework of their own past performance, subjects who set goals and receive success or failure information stated within the framework of their peer groups' performance, subjects who set goals but receive only performance information, and subjects who do not set goals but receive only performance information.

Effects of the subject variables on learning performance

1. Variations in combination of MA, CA, and IQ levels do affect learning performance. Retarded, normal, and superior subjects who have similar mental ages but different chronological ages respond in this way. In verbal discrimination learning, retarded, normal, and superior subjects tend to perform with equivalent adequacy. In verbal rote learning and verbal concept formation, retarded subjects perform less adequately than both normal and superior subjects while normal and superior subjects perform with equivalent adequacy. In non-verbal discrimination learning, rote learning, and concept formation, retarded subjects perform more adequately than both normal and superior subjects while normal subjects perform more adequately than superior subjects.

2. Variations in placement type do not affect learning performance consistently. No differences occur in the performance of institutionalized and non-instutionalized retarded subjects in situations which involve the following: verbal concept formation, and non-verbal discrimination learning, rote learning, and concept formation. Institutionalized retarded subjects perform more adequately in verbal discrimination learning.

3. Variations in sex do not affect learning performance. No differences occur in the learning performance of male and female subjects.

Interaction effect of the reinforcement variables on learning performance

1. Variations in reinforcement type-frequency and orientation do not interact to affect learning performance. No differences occur in the learning performance of the following: subjects who set goals and receive different combinations of success and failure information stated in group or individual frames of reference, subjects who set goals but receive only performance information, and subjects who do not set goals but receive only performance information.

Interaction effects of the subject variables on learning performance

1. Variations in placement type and combination of MA, CA, and IQ levels do not interact to affect learning performance. No differences occur in the relative learning performance of the following: non-institutionalized retarded subjects and normal and superior subjects and institutionalized retarded subjects and normal and superior subjects.

2. Variations in sex and combination of MA, CA, and IQ levels do not interact to affect learning performance. No differences occur in the relative learning performance of male retarded, normal, and superior subjects and female retarded, normal and superior subjec

3. Variations in sex and placement type do not interact to affect learning performance. No differences occur in the relative learning performance of male institutionalized and non-institutionalized retarded subjects and female institutionalized and non-institutionalized retarded subjects.

Interaction effects of the reinforcement and subject variables on learning performance

1. Variations in reinforcement type-frequency and combination of MA, CA, and IQ levels do not interact to affect learning performance. No differences occur in the relative learning performance of the following: retarded, normal, and superior subjects who set goals and receive several frequencies of success or failure information; retarded, normal, and superior subjects who set goals but receive only performance information; and retarded, normal and superior subjects who do not set goals but receive only performance information.

2. Variations in reinforcement orientation and combination of MA, CA, and IQ levels do not interact to affect learning performance. No differences occur in the relative learning performance of the following; retarded, normal, and superior subjects who receive several frequencies of success or failure information stated in individual or group frames of reference; retarded, normal, and superior subjects who set goals but receive only performance information; and retarded, normal, and superior subjects who do not set goals but receive only performance information.

3. Variations in reinforcement type-frequency and placement type do not interact to affect learning performance. No differences occur in the relative learning performance of the following: institutionalized and non-institutionalized retarded subjects who set goals and receive several frequencies of success or failure information; institutionalized and non-institutionalized retarded subjects who set goals but receive only performance information; and institutionalized and non-institutionalized retarded subjects who do not set goals but receive only performance information.

4. Variations in reinforcement orientation and placement type do not interact to affect learning performance. No differences occur in the relative learning performance of the following: institutionalized and non-institutionalized retarded subjects who set goals and receive several frequencies of success or failure information stated in individual or group frames of reference; institutionalized and non-institutionalized retarded subjects who set goals but receive only performance information; and institutionalized and non-institutionalized retarded subjects who do not set goals but receive only performance information.

5. Variations reinforcement type-frequency and sex do not interact to affect learning performance. No differences occur in the relative learning performance of the following: male and female subjects who set goals and receive several frequencies of success or failure information; male and female subjects who set goals but receive only performance information: and male and female subjects who do not set goals but receive only performance information.

6. Variations in reinforcement orientation and sex do not interact to affect learning performance. No differences occur in the relative learning performance of male and female subjects who set goals and receive success or failure information stated in individual or group frames of reference, male and female subjects who set goals but receive only performance information, and male and female subjects who do not set goals but receive only performance information.

Interaction effects of the reinforcement and task variables on learning performance

1. Variations in reinforcement type-frequency and task characteristics do not interact to affect learning performance. On tasks differentiated in terms of level of complexity and degree of verbalization involved, no differences occur in the learning performance of the following: subjects who set goals and receive several frequencies of success or failure information, subjects who set goals but receive only performance information, and subjects who do not set goals but receive only performance information.

2. Variations in reinforcement orientation and task characteristics do not interact to affect learning performance. On tasks differentiated in terms of level of complexity and degree of verbalization involved, no differences occur in the learning performance of the following: subjects who set goals and receive success or failure information stated in group or individual frames of reference, subjects who set goals but receive only performance information, and subjects who do not set goals but receive only performance information.

Interaction effects of the subject and task variables on learning performance

1. Variations in combination of MA, CA, and IQ levels and task

characteristics interact, to some extent, to affect learning performance. On non-verbal tasks, a positive relationship is apparent between chronological age level and performance adequacy; intelligence level and task complexity are not influential. On tasks involving non-oral, motor responses related to discrimination learning, rote learning, and concept formation, older retarded subjects perform more adequately than younger normal subjects, and both groups perform more adequately than still younger superior subjects. Conversely, on verbal tasks, chronological age level is not operant; instead, there is some positive relationship between intelligence level and task complexity. In discrimination learning, subjects perform with equivalent adequacy; on more complex rote learning and concept formation tasks, retarded subjects perform less adequately than normal and superior subjects who, in turn, perform with similar adequacy.

2. Variations in sex and task characteristics do not interact to affect learning performance. No differences occur in the relative learning performance of male and female subjects on task differe tiated in terms of level of complexity and extent of overt verbalization involved.

3. Variations in placement type and task characteristics do not interact to affect learning performance. No differences occur in the relative learning performance of institutionalized and non-institutionalized subjects on tasks differentiated according to level of complexity and degree of verbalization involved.

Level of Aspiration Behavior

The following generalizations pertain to level of aspiration behavior as it is reflected by absolute, positive, and negative goal discrepancy scores and by directions of goal changes after success or failure.

Effects of the reinforcement variables on level of aspiration behavior

1. Variations in reinforcement type-frequency do not affect level of aspiration behavior. No differences occur in the level of aspiration behavior of the following: subjects who set goals and receive several frequencies of success or failure information and subjects who set goals but receive only performance information.

2. Variations in reinforcement orientation do not affect level of aspiration behavior. No differences occur in the level of aspiration behavior of subjects who set goals and receive success or failure information stated within the framework of their own past performance, subjects who set goals and receive success or failure information stated within the framework of their peer groups' performance, and subjects who set goals but receive only performance information.

Effects of the subject variables on level of aspiration behavior

1. Variations in combination of MA, CA, and IQ do not affect level

of aspiration behavior. No differences occur in the level of aspiration behavior of retarded, normal, and superior subjects who have similar mental ages but different chronological ages.

2. Variations in placement type do not affect level of aspiration behavior. No differences occur in the level of aspiration behavior of institutionalized and non-institutionalized retarded subjects.

3. Variations in sex do not affect level of aspiration behavior. No differences occur in the level of aspiration behavior of male and female subjects.

Interaction effects of the reinforcement variables on level of aspiration behavior

1. Variations in reinforcement type-frequency and orientation do not interact to affect level of aspiration behavior. No differences occur in the level of aspiration behavior of the following: subjects who set goals and receive different combinations of success and failure information stated in group or individual frames of reference and subjects who set goals but receive only performance information.

Interaction effects of the subject variables on level of aspiration behavior

1. Variations in placement type and combination of MA, CA, and IQ levels do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of the following: non-institutionalized retarded subjects and normal and superior subjects and institutionalized retarded subjects and normal and superior subjects.

2. Variations in sex and combination of MA, CA, and IQ levels do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of male retarded, normal and superior subjects and female retarded, normal, and superior subjects.

3. Variations in placement type and sex do not interact to affect level of aspiration behavior. No differences occur in the level of aspiration behavior of male institutionalized and non-institutionalized retarded subjects and female institutionalized and non-institutionalized retarded subjects.

Interaction effects of the reinforcement and subject variables on level of aspiration behavior

1. Variations in reinforcement type-frequency and combination of MA, CA, and IQ levels do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of the following: retarded, normal, and superior subjects who set goals and receive several frequencies of success or failure information; and retarded, normal, and superior subjects who set goals but receive only performance information.

2. Variations in reinforcement orientation and combination of MA, CA, and IQ levels do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of the following: retarded, normal, and superior subjects who set goals and receive several frequencies of success or failure information stated in individual or group frames of reference; and retarded, normal, and superior subjects who set goals but receive only performance information.

3. Variations in reinforcement type-frequency and placement type do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of the following: institutionalized and non-institutionalized retarded subjects who set goals and receive several frequencies of success or failure information and institutionalized and non-institutionalized retarded subjects who set goals but receive only performance information.

4. Variations in reinforcement orientation and placement type do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of the following: institutionalized and non-institutionalized retarded subjects who set goals and receive success or failure information stated in individual and group frames of reference and institutionalized and non-institutionalized subjects who set goals but receive only performance information.

5. Variations in reinforcement type-frequency and sex do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of the following: male and female subjects who set goals and receive several frequencies of success and failure information and male and female subjects who set goals but receive only performance information.

6. Variations in reinforcement orientation and sex do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of the following: male and female subjects who set goals and receive success or failure information stated in individual or group frames of reference and male and female subjects who set goals but receive only performance information.

Interaction effects of the reinforcement and task variables on level of aspiration behavior

1. Variations in reinforcement type-frequency and task characteristics do not interact consistently to affect level of aspiration behavior. On tasks differentiated in terms of level of complexity and degree of verbalization involved, no differences occur in the relative level of aspiration behavior of the following: subjects who set goals and receive several frequencies of success or failure information and subjects who set goals but receive only performance information.

2. Variations in reinforcement orientation and task characteristics do not interact to affect level of aspiration behavior. On tasks differentiated in terms of level of complexity and degree of verbalization involved, no differences occur in the level of aspiration behavior of the following: subjects who set goals and receive success or failure information stated in group or individual frames of reference and subjects who set goals but receive only performance information.

Interaction effects of the subject and task variables on level of aspiration behavior

1. Variations in combination of MA, CA, and IQ and task characteristics do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of retarded, normal, and superior subjects on tasks differentiated in terms of level of complexity and degree of overt verbalization involved.

2. Variations in sex and task characteristics do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of male and female subjects on tasks differentiated in terms of level of complexity and degree of overt verbalization.

3. Variations in placement type and task characteristics do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of institutionalized and non-institutionalized retarded subjects on tasks differentiated according to level of complexity and degree of overt verbalization involved.

CHAPTER V

SUMMARY

Problem

Purpose and Objectives

The purpose of this investigation was to study the effects and interaction effects of selected reinforcement, task, and subject variables on learning performance and level of aspiration behavior. The specific objectives consequent to this purpose were to examine the following.

1. Effects of the reinforcement variables on (a) learning performance and (b) level of aspiration behavior.
2. Effects of the subject variables on (a) learning performance and (b) level of aspiration behavior.
3. Interaction effect of the reinforcement variables on (a) learning performance and (b) level of aspiration behavior.
4. Interaction effects of the subject variables on (a) learning performance and (b) level of aspiration behavior.
5. Interaction effects of the reinforcement and subject variables on (a) learning performance and (b) level of aspiration behavior.
6. Interaction effects of the reinforcement and task variables on (a) learning performance and (b) level of aspiration behavior.
7. Interaction effects of the subject and task variables on (a) learning performance and (b) level of aspiration behavior.

Educational Significance

An important purpose of education involves the selection of experiences which are conducive to the student's achieving intellectually at a level commensurate with expectations based on his assessed capacity and to his becoming increasingly self-directed or self-motivated in this process. Accomplishing this goal is a primary concern of those who seek to achieve excellence through an educational framework designed to foster in each student the ability to use his talents in the process of satisfying his own personal needs and contributing to the society of which he is a member. A problem is posed, however, by evidence that this goal is not being attained to a desired extent. This problem is especially crucial for educators and solutions are contingent upon examining some of its bases. Doing so involves studying a number of facets of the educational process. One important facet is conditions related to learning. To study certain of these conditions, the present investigation was undertaken.

Related Research

Research reviewed encompassed studies in which individuals below college age were used in investigating the effects and interaction effects of reinforcement, task, and subject variables on intellectual performance and motivation. For example, these investigations included, among others, those concerned with how such reinforcement variables as material reward, praise and reproof, competition, success and failure, and goal setting and such subject variables as chronological age level, sex, intelligence level, academic achievement level, and personality adjustment related singly and in combination to such dependent variables as learning and task performance, level of aspiration behavior, persistence, and perception of task attractiveness.

Procedure

Experimental Design

The major components of the experimental design were the reinforcement, subject, and task variables. The subject variables were intelligence level, chronological age level, sex, and placement type; mental age level was held constant. The reinforcement variables consisted of type, frequency, and orientation of reinforcement information. Reinforcement type-frequency included 100% success, 66% success--33% failure, 33% success--66% failure, and 100% failure. Reinforcement orientation involved an individual orientation and a group orientation. Controls were the level of aspiration control in which the subjects set goals and received only performance information and the speed and accuracy control in which the subjects received only performance information. The overlap of the two reinforcement variables formed 12 combinations: 100% success, individual orientation; 100% success, group orientation; 66% success--33% failure, individual orientation; 66% success--33% failure, group orientation;

etc. The task variables were level of complexity and extent of overt verbalization involved in task activities. The level of task complexity variants included discrimination learning, rote learning, and concept formation; the extent of task verbalization variants, verbal and non-verbal. The overlap of the task variables resulted in six tasks: the discrimination learning verbal, the discrimination learning non-verbal, the rote learning verbal, the rote learning non-verbal, the concept formation verbal, and the concept formation non-verbal tasks.

Definitions of Terms

For the purposes of this investigation, the following definitions of terms were employed in reference to the several independent variables.

Subjects

1. Mental age. Index reflecting the total number of items the subject successfully completes on the Form L of the Stanford-Binet Test of Intelligence, 1937 Revision.
2. Chronological age. Age determined by subtracting the subject's birth date from a specified date prior to the initiation of task administration.
3. Intelligence quotient. Index based on the relationship between the subject's CA and the MA he attains on the Form L of the Stanford-Binet Test of Intelligence, 1937 Revision; derived by consulting the data presented in the Terman-Merrill tables (Terman and Merrill, 1937).
4. Placement type. Location of residence and school attendance.
    a. Non-institutional placement. Residence in a community and attendance at a public day school.
    b. Institutional placement. Residence and school attendance in an institution for the mentally retarded.
5. Intellectually retarded subjects. Subjects whose IQ's are within the limits of 50 to 75.
6. Intellectually normal subjects. Subjects whose IQ's are within the limits of 90 to 110.
7. Intellectually superior subjects. Subjects whose IQ's are 120 or higher.

Tasks

1. Learning performance. Change in the learning response measures in the expected direction under the conditions of practice (McGeoch and Irion, 1952).

2. Level of complexity. Dimension reflecting the numbers of stimulus and response elements involved in the tasks and the relationships among these (Underwood, 1949).

    a. Discrimination learning. Association of a single response with a single stimulus. Emphasis is upon the correct response being a function of the selection of and the subsequent response to the correct or positive stimulus from among several stimuli (Woodworth, 1954; Underwood, 1949).

    b. Rote learning. Association and integration of a series of discrete responses with a series of discrete stimuli. Emphasis is upon the correct response being a function of the arbitrary association between the several pairs of discrete stimuli and responses (Underwood, 1949).

    c. Concept formation. Association of a single response to single representatives of a group of stimuli which are categorized on the basis of a common underlying attribute. Emphasis is upon the correct response being a function of a generalizing process which follows a discrimination of similarities and differences among the stimuli (Underwood, 1949).

3. Extent of task verbalization. Dimension reflecting the means by which the stimuli are presented and the responses are made (McGeoch and Irion, 1952).

    a. Verbal task. Task in which the subject is required to respond orally to orally presented stimuli when the investigator-subject face-to-face situation is at a maximum; *i.e.*, task in which overt response requires oral manipulation of nonsense syllables or words.

    b. Non-verbal task. Task in which the subject is required to respond manually to non-orally presented stimuli when the investigator-subject face-to-face situation is at a minimum; *i.e.*, task in which overt response requires manipulation of task materials containing letters, numbers, or other non-word symbols.

Reinforcement

1. Level of aspiration technique. Technique in which the subject is required to make estimates of what his subsequent performance will be after his previous performance is described to him.

2. Type of reinforcement. Presentation of success or failure information.

   a. Success. Attainment by the subject of a performance score (time) which is equal to or less than the score set by him as his goal.

   b. Failure. Attainment by the subject of a performance score (time) which is more than the score set by him as his goal.

3. Frequency of reinforcement. Percentage reflecting the number of trials on which success or failure information is presented to the subjects.

4. Orientation of reinforcement. Frame of reference or context within which the subject's success or failure information is presented.

   a. Individual. Success or failure information framed within the context of subject's own performance on previous trials.

   b. Group. Success or failure information framed within the context of the performance of other boys or girls in the subject's age group.

Sampling Procedure

Four groups of subjects, termed major levels groups, were employed. Each group consisted of 96 subjects. Three of the major levels groups were retarded, normal, and superior subjects who were selected from the regular and special classes of the public schools in such a way that MA was constant and CA varied. The fourth major levels group was a group of retarded subjects who were chosen from institutions for the intellectually retarded. This institutionalized retarded group was selected to be similar to the non-institutionalized retarded group in IQ, MA, and CA. No attempt was made to control sex frequencies by selection.

What were termed base cell groups were established in this way. The overlapping of the reinforcement orientation and type-frequency dimensions formed 12 cells, designated base cells. The 96 subjects in each major levels group were assigned randomly to the 12 cells, thus forming 12 base cell groups of eight subjects each; these combined to make 48 base cell subgroups for the entire design.

Administration of the Tasks and Reinforcement Information

The subjects in the four levels groups were administered the six tasks individually in conjunction with the 12 combinations of the two reinforcement variables.

The type-frequency and orientation variants were administered within the framework of the level of aspiration technique. The particular combination of reinforcement variants a subject received was determined by the base cell group to which he was assigned; in turn, the combination of variants which a base cell group received was changed from task to task.

Throughout any one task administration all subjects were given directions for speed and accuracy. The reinforcement information was administered to the type-frequency--orientation groups in three phases: a control phase in which the subjects received only performance information, a differential phase in which the subjects set goals and received the several frequencies of success or failure information within the individual or group orientation, and a terminal phase in which the subjects set goals and received 100% success information within the individual or group orientation. The level of aspiration control subjects received the control phase and they set goals and received performance information during the latter two phases. The speed and accuracy control subjects operated under the conditions of the control phase throughout a task.

Response Measures and Statistical Analyses

Learning performance and level of aspiration behavior were the dependent variables specified in the research objectives. The learning response measures included attainment time and number of responses required to complete a trial. The level of aspiration response measures consisted of absolute, positive, and negative goal discrepancy scores and frequencies reflecting directions of goal changes after success and failure. For each type of response measure, individual trial scores were grouped for analysis at four practice levels.

The frequencies were analyzed by what was essentially a critical ratio test for differences between independent proportions. The remaining response measures were manipulated by a conventional square root transformation in order to normalize the score distribution and ensure homogeneity of variance. The transformed scores were treated by analysis of covariance. When indicated, subsequent paired comparisons were made using the Kramer multiple range technique. The .01 probability level was the criterion for rejecting null hypotheses about frequencies and means.

Results and Discussion

The procedures described above for collecting and analyzing data were used to obtain evidence relevant to the concern of the study: the effects and interaction effects of the reinforcement, subject, and task variables on learning performance and level of aspiration behavior. Briefly, the data revealed the following. The reinforcement variables--singly, in combination with each other, or in combination with the subject or the task variables--did not affect learning performance or level of aspiration behavior consistently. The sex and placement type variables--singly, in combination with each other, or in combination with the levels or the task variables--did not affect learning performance or level of aspiration behavior consistently. The levels variable--singly and, to some extent, in combination with the task variables--did affect learning performance. The levels variable--singly or in combination with the task variables--did not affect level of aspiration behavior.

These results are consistent with information presented by such researchers as Benton (1936), Grace (1948), Johnson and Blake (1960), and Walter and Marzolf (1951). They are inconsistent with information presented by such investigators as Anderson (1936), Hurlock (1925), Maller (1929), and Sears (1940). Factors useful in explaining inconsistencies between previous data and current data relate to such issues as these: characteristics of the reinforcement information; aspects of the task situation; kinds of control groups; conditions related to administering the tasks and the reinforcement information to the subjects; nature of the subjects' experiential backgrounds related to success and failure; attributes of the subjects' attitudes toward success and failure and toward institutionalization; length of the subjects' institutionalization; and types of institutions from which subjects were selected.

Conclusions

Certain conclusions about both learning performance and level of aspiration behavior seem warranted by data obtained in this investigation, factors considered in the discussion of these data, and information presented by previous investigators. These conclusions are presented below; they are organized in terms of the research objectives specified as following from the purpose of the investigation.

Learning Performance

The following generalizations are germane to learning performance as it is reflected by attainment time and number of responses scores.

Effects of the reinforcement variables on learning performance

1. Variations in reinforcement type-frequency do not affect learning performance. No differences occur in the learning performance of the following: subjects who set goals and receive several frequencies of success or failure information, subjects who set goals but receive only performance information, and subjects who do not set goals but receive only performance information.

2. Variations in reinforcement orientation do not affect learning performance. No differences occur in the learning performance of the following: subjects who set goals and receive success or failure information stated within the framework of their own past performance, subjects who set goals and receive success or failure information stated within the framework of their peer groups' performance, subjects who set goals but receive only performance information, and subjects who do not set goals but receive only performance information.

Effects of the subject variables on learning performance

1. Variations in combination of MA, CA, and IQ levels do affect learning performance. Retarded, normal, and superior subjects who have similar mental ages but different chronological ages respond in this way. In verbal discrimination learning, retarded, normal, and superior subjects tend to perform with equivalent adequacy. In verbal rote learning and verbal concept formation, retarded subjects perform less adequately than both normal and superior subjects while normal and superior subjects perform with equivalent adequacy. In non-verbal discrimination learning, rote learning, and concept formation, retarded subjects perform more adequately than both normal and superior subjects while normal subjects perform more adequately than superior subjects.

2. Variations in placement type do not affect learning performance consistently. No differences occur in the performance of institutionalized and non-institutionalized retarded subjects in situations which involve the following: verbal concept formation, and non-verbal discrimination learning, rote learning, and concept formation. Institutionalized retarded subjects perform more adequately in verbal discrimination learning.

3. Variations in sex do not affect learning performance. No differences occur in the learning performance of male and female subjects.

Interaction effects of the reinforcement variables on learning performance

1. Variations in reinforcement type-frequency and orientation do not interact to affect learning performance. No differences occur in the learning performance of the following: subjects who set goals and receive different combinations of success and failure information stated in group or individual frames of reference, subjects who set goals but receive only performance information, and subjects who do not set goals but receive only performance information.

Interaction effects of the subject variables on learning performance

1. Variations in placement type and combination of MA, CA, and IQ levels do not interact to affect learning performance. No differences occur in the relative learning performance of the following: non-institutionalized retarded subjects and normal and superior subjects and institutionalized retarded subjects and normal and superior subjects.

2. Variations in sex and combination of MA, CA, and IQ levels do not interact to affect learning performance. No differences occur in the relative learning performance of male retarded, normal, and superior subjects and female retarded, normal, and superior subjects.

3. Variations in sex and placement type do not interact to affect learning performance. No differences occur in the relative learning performance of male institutionalized and non-institutionalized retarded subjects and female institutionalized and non-institutionalized retarded subjects.

Interaction effects of the reinforcement and subject variables on learning performance

1. Variations in reinforcement type-frequency and combination of MA, CA, and IQ levels do not interact to affect learning performance. No differences occur in the relative learning performance of the following: retarded, normal, and superior subjects who set goals and receive several frequencies of success or failure information; retarded, normal, and superior subjects who set goals but receive only performance information, and retarded, normal, and superior subjects who do not set goals but receive only performance information.

2. Variations in reinforcement orientation and combination of MA, CA, and IQ levels do not interact to affect learning performance. No differences occur in the relative learning performance of the following: retarded, normal, and superior subjects who receive several frequencies of success or failure information stated in individual or group frames of reference; retarded, normal, and superior subjects who set goals but receive only performance information; and retarded, normal, and superior subjects who do not set goals but receive only performance information.

3. Variations in reinforcement type-frequency and placement type do not interact to affect learning performance. No differences occur in the relative learning performance of the following:

institutionalized and non-institutionalized retarded subjects who set goals and receive several frequencies of success failure information; institutionalized and non-institutionalized retarded subjects who set goals but receive only performance information; and institutionalized and non-institutionalized retarded subjects who do not set goals but receive only performance information.

4. Variations in reinforcement orientation and placement type do not interact to affect learning performance. No differences occur in the relative learning performance of the following: institutionalized and non-institutionalized retarded subjects who set goals and receive several frequencies of success or failure information stated in individual or group frames of reference; institutionalized and non-institutionalized retarded subjects who set goals but receive only performance information; and institutionalized and non-institutionalized retarded subjects who do not set goals but receive only performance information.

5. Variations in reinforcement type-frequency and sex do not interact to affect learning performance. No differences occur in the relative learning performance of the following: male and female subjects who set goals and receive several frequencies of success or failure information; male and female subjects who set goals but receive only performance information; and male and female subjects who do not set goals but receive only performance information.

6. Variations in reinforcement orientation and sex do not interact to affect learning performance. No differences occur in the relative learning performance of male and female subjects who set goals and receive success or failure information stated in individual or group frames of reference, male and female subjects who set goals but receive only performance information, and male and female subjects who do not set goals but receive only performance information.

Interaction effects of the reinforcement and task variables on learning performance

1. Variations in reinforcement type-frequency and task characteristics do not interact to affect learning performance. On tasks differentiated in terms of level of complexity and degree of verbalization involved, no differences occur in the learning performance of the following: subjects who set goals and receive several frequencies of success or failure information, subjects who set goals but receive only performance information, and subjects who do not set goals but receive only performance information.

2. Variations in reinforcement orientation and task characteristics do not interact to affect learning performance. On tasks differentiated in terms of level of complexity and degree of verbalization involved, no differences occur in the learning performance of the following: subjects who set goals and receive success or failure information stated in group or individual frames of reference, subjects who set goals but receive only

performance information, and subjects who do not set goals but receive only performance information.

Interaction effects of the subject and task variables on learning performance

1. Variations in combination of MA, CA, and IQ levels and task characteristics interact, to some extent, to affect learning performance. On non-verbal tasks, a positive relationship is apparent between chronological age level and performance adequacy; intelligence level and task complexity are not influential. On tasks involving non-oral, motor responses related to discrimination learning, rote learning, and concept formation, older retarded subjects perform more adequately than younger normal subjects, and both groups perform more adequately than still younger superior subjects. Conversely, on verbal tasks, chronological age level is not operant; instead, there is some positive relationship between intelligence level and task complexity. In discrimination learning, subjects perform with equivalent adequacy; on more complex rote learning and concept formation tasks, retarded subjects perform less adequately than normal and superior subjects who, in turn, perform with similar adequacy.

2. Variations in sex and task characteristics do not interact to affect learning performance. No differences occur in the relative learning performance of male and female subjects on tasks differentiated in terms of level of complexity and extent of overt verbalization involved.

3. Variations in placement type and task characteristics do not interact to affect learning performance. No differences occur in the relative learning performance of institutionalized and non-institutionalized subjects on tasks differentiated according to level of complexity and degree of verbalization involved.

Level of Aspiration Behavior

The following generalizations pertain to level of aspiration behavior as it is reflected by absolute, positive, and negative goal discrepancy scores and by directions of goal changes after success and failure.

Effects of the reinforcement variables on level of aspiration behavior

1. Variations in reinforcement type-frequency do not affect level of aspiration behavior. No differences occur in the level of aspiration behavior of the following: subjects who set goals and receive several frequencies of success and failure information and subjects who set goals but receive only performance information.

2. Variations in reinforcement orientation do not affect level of aspiration behavior. No differences occur in the level of aspiration behavior of subjects who set goals and receive success

and failure information stated within the framework of their own past performance, subjects who set goals and receive success and failure information stated within the framework of their peer groups' performance, and subjects who set goals but receive only performance information.

Effects of the subject variables on level of aspiration behavior

1. Variations in combination of MA, CA, and IQ do not affect level of aspiration behavior. No differences occur in the level of aspiration behavior of retarded, normal, and superior subjects who have similar mental ages but different chronological ages.

2. Variations in placement type do not affect level of aspiration behavior. No differences occur in the level of aspiration behavior of institutionalized and non-institutionalized retarded subjects.

3. Variations in sex do not affect level of aspiration behavior. No differences occur in the level of aspiration behavior of male and female subjects.

Interaction effect of the reinforcement variables on level of aspiration behavior

1. Variations in reinforcement type-frequency and orientation do not interact to affect level of aspiration behavior. No differences occur in the level of aspiration behavior of the following: subjects who set goals and receive different combinations of success and failure information stated in group and individual frames of reference and subjects who set goals but receive only performance information.

Interaction effects of the subject variables on level of aspiration behavior

1. Variations in placement type and combination of MA, CA, and IQ levels do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of the following: non-institutionalized retarded subjects and normal and superior subjects and institutionalized retarded subjects and normal and superior subjects.

2. Variations in sex and combination of MA, CA, and IQ levels do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of male retarded, normal, and superior subjects and female retarded, normal, and superior subjects.

3. Variations in placement type and sex do not interact to affect level of aspiration behavior. No differences occur in the level of aspiration behavior of male institutionalized and non-institutionalized retarded subjects and female institutionalized and non-institutionalized retarded subjects.

Interaction effects of the reinforcement and subject variables on level of aspiration behavior

1. Variations in reinforcement type-frequency and combination of MA, CA, and IQ levels do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of the following: retarded, normal, and superior subjects who set goals and receive several frequencies of success or failure information; and retarded, normal, and superior subjects who set goals but receive only performance information.

2. Variations in reinforcement orientation and combination of MA, CA, and IQ levels do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of the following: retarded, normal, and superior subjects who set goals and receive several frequencies of success or failure information stated in individual or group frames of reference; and retarded, normal, and superior subjects who set goals but receive only performance information.

3. Variations in reinforcement type-frequency and placement type do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of the following: institutionalized and non-institutionalized retarded subjects who set goals and receive several frequencies of success or failure information and institutionalized and non-institutionalized retarded subjects who set goals but receive only performance information.

4. Variations in reinforcement orientation and placement type do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of the following: institutionalized and non-institutionalized retarded subjects who set goals and receive success or failure information stated in individual and group frames of reference and institutionalized and non-institutionalized subjects who set goals but receive only performance information.

5. Variations in reinforcement type-frequency and sex do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of the following: male and female subjects who set goals and receive several frequencies of success and failure information and male and female subjects who set goals but receive only performance information.

6. Variations in reinforcement orientation and sex do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of the following: male and female subjects who set goals and receive success or failure information stated in individual or group frames of reference and male and female subjects who set goals but receive only performance information.

Interaction effects of the reinforcement and task variables on level of aspiration behavior

1. Variations in reinforcement type-frequency and task characteristics do not interact consistently to affect level of aspiration behavior. On tasks differentiated in terms of level of complexity and degree of verbalization involved, no differences occur in the relative level of aspiration behavior of the following: subjects who set goals and receive several frequencies of success or failure information and subjects who set goals but receive only performance information.

2. Variations in reinforcement orientation and task characteristics do not interact to affect level of aspiration behavior. On tasks differentiated in terms of level of complexity and degree of verbalization involved, no differences occur in the level of aspiration behavior of the following: subjects who set goals and receive success or failure information stated in group or individual frames of reference and subjects who set goals but receive only performance information.

Interaction effects of the subject and task variables on level of aspiration behavior

1. Variations in combination of MA, CA, and IQ and task characteristics do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of retarded, normal, and superior subjects on tasks differentiated in terms of level of complexity and degree of overt verbalization involved.

2. Variations in sex and task characteristics do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of male and female subjects on tasks differentiated in terms of level of complexity and degree of overt verbalization.

3. Variations in placement type and task characteristics do not interact to affect level of aspiration behavior. No differences occur in the relative level of aspiration behavior of institutionalized and non-institutionalized retarded subjects on tasks differentiated according to level of complexity and degree of overt verbalization involved.

Limitations

The following restrictions are noted and stressed. All conclusions are limited to the conditions involved in this investigation: *viz.*, to populations similar to those from which the subjects were selected; to reinforcement variables, task variables, and procedures similar to those employed; and to response measures and aspects of behavior similar to those examined. Wider generalization is contingent upon further research. Also pertinent are comments by Johnson and Blake (1960) about the applicability of information such as that accrued herein to children's behavior in the classroom.

> Finally, it must be realized that the investigations reported herein and proposed are primarily theoretical in nature. For purposes of experimental control, it was necessary that the task materials, and the manner in which they were manipulated, be (types with which the subjects had had no) specific prior experience, and that certain related and highly important variables be regulated as much as possible. In addition, the circumstances related to the task administration cannot be considered to reflect the circumstances existing in a classroom. That is to say, the dynamics operating in the research situation and those operating in a classroom situation probably are not comparable directly. As a result, the generalizations emanating from investigations such as these are not applicable directly to academic learning within the classroom. Rather, they should be considered as basic data which should be extended or evaluated further in a parallel series of investigations in which tasks and experimental conditions (are) more representative of the average classroom situation (p. 153).

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APPENDICES

APPENDIX A

COOPERATING SCHOOL PERSONNEL

Baldwinsville, N.Y.

Mr. Theodore Durgee, Supervising Principal, Baldwinsville Central Schools.

Baldwinsville High School

Principal: Mr. Donald W. Coats. Guidance Counsellor: Miss Mae E. Reynolds. Teacher: Mrs. Birt Evans.

Elizabeth St. School

Principal: Mr. Joseph Ritter. Guidance Counsellor: Mrs. Alice Soule. Teachers: Mrs. Verona Dram, Mrs. Sarah Riddell, Mrs. Beverly Fuller, Miss Millie Bellon.

Van Buren School

Principal: Mr. Leslie G. Eisenhour. Teachers: Mrs. Ruth Day, Mrs. Pauline Clarke.

Camden, N.Y.

Director of Pupil Personnel Services: Mr. Robert Mills. School Psychologist: Mr. Calvin Mosher. Director of the Special Class Program: Mrs. Jane Andrews.

Canastota, N.Y.

Mrs. Pauline Campbell, Elementary School Supervisor, Canastota Central Schools.

Canastota Central School

Principal: Mr. William Pardee. Secretaries: Mrs. Jessie DeFazio, Mrs. Joseph Masucci. Teachers: Mrs. Nellie McPherson, Mr. Gerald Jones.

East Syracuse, N.Y.

East Syracuse Junior--Senior High School

Principal: Mr. Stanley Zamory. Guidance Counsellor: Mrs. Harriet Brown. Teacher: Mr. William Woznek.

Heman Avenue School

Principal: Mrs. Dorothy Ward. Teachers: Mrs. Helen Boland, Miss Mary Engles.

Liverpool, N.Y.

Mr. Frank Rhyner, School Psychologist.

Liverpool, N.Y.

Liverpool Elementary School

Principal: Mr. James Dunn. Guidance Counsellor: Miss Margaret Heffernan. Teacher: Mr. Donald Yurkonis.

Oneida, N.Y.

Dr. Monroe Levin, School Psychologist.

Castle Street School

Principal: Miss Mildred A . Ridley. Secretary: Miss Ruth Erdige. Teacher: Mrs. Fish.

Seneca Street School

Principal: Mrs. Margaret E. Waters. Teacher: Miss Leona Felshaw.

Marcellus, N.Y.

Miss Kathryn Heffernan, Elementary School Supervisor.

Marcellus Elementary School

Secretary: Mrs. Dilys Kingsbury. Teachers: Mrs. Barbara Aldrich, Miss Helen Heenan, Miss Ann Holmes, Miss Rita Larkin, Miss Margaret Walsh, Mrs. Helen Eggerton, Mrs. Ava Freze, Mrs. LeVerne Mackin, Miss Patricia Coyne, Mrs. Barbara True, Miss Mary Ramsden, Miss Mary Horbiger, Mrs. Sarah Wiggers, Mrs. Margaret Shay, Mrs. Helene Bush.

Rome, N.Y.

Mr. William G. Young, Director of Pupil Personnel Services. Mr. Joseph Wissman, School Psychologist.

Laurel St. School

Principal: Mr. Price Aderman. Teachers: Mrs. Gwendolyn McClusky, Mrs. Margaret van Ness.

Staley School.

Principal: Dr. Wallace Luddin. Teacher: Mrs. Helen Prevo.

Syracuse, N.Y.

Mr. David Sine, Assistant Director of Research. Miss Isa Cole, Supervisor, Education of Exceptional Children.

Central High School

Principal: Dr. Edward Lang. Assistant Principal: Mr. George Berry. Teachers: Mrs. Harriet Chamberlain, Mrs. Dorothy Towner.

Syracuse, N.Y.

Charles Andrews School

Principal: Mr. Frank List. Secretary: Mrs. Theresa Pierce. Teachers: Mrs. Marion Burksdale, Mrs. Deneise Donahue, Mrs. Virginia Morris, Mrs. Catherine O'Shea, Mrs. Lenna Parker, Mrs. Evelyn Seavy.

Delaware School

Principal: Mr. Kenneth J. Drake. Secretary: Mrs. Evelyn Zaleon. Teachers: Mrs. Irene Carlton, Mr. Joseph Gangemi, Mr. Harold Ginsberg, Mrs. Betty Wackerle.

Edward Smith School

Principal: Mrs. Elsie Platto. Secretary: Mrs. Mildred Jones. Teachers: Miss Myra Mt. Pleasant, Mrs. Agnes Gorman, Mrs. Mary Schreck, Mrs. Louise Johnson, Mrs. Margaret Devereaux, Miss Vera Dexter, Mrs. Evelyn Schneider.

Franklin School

Principal: Miss S. Marcella Jones. Secretary: Miss Marie Scully. Teachers: Miss Alice Thornton, Mrs. Florence Belge, Miss Mary Hargaden, Mrs. Lillian Pudlin, Mrs. Beulah Stemler, Mrs. Florence Heddon.

Frazer School

Principal: Mr. Thomas Ingraham. Teachers: Mrs. Marie Long, Mrs. Gwendolyn Donahue.

Grant Junior High School

Principal: Mr. H. R. Peet. Secretary: Mrs. Claire Wescott. Teachers: Miss Kathryn Dwyer, Mr. George Jurik.

West Genessee Central Schools, N.Y.

Mr. John F. Calvert, School Psychologist.

Camillus Elementary School

Principal: Mr. Reid A. Pringle. Secretary: Mrs. Prue Wiegard. Teachers: Mrs. Ruth Edwards, Mr. Robert Fugo, Miss Clara Fenlon, Mrs. Evelyn Howell, Miss Helen Nagy, Mrs. Helen Neilson, Miss Arlene Sheldon, Mrs. Barbara Stanislay.

East Hill School

Principal: Mrs. Ruth Kearns. Secretary: Mrs. Arlene Jerry. Teachers: Mr. James Clark, Mrs. Marjorie Glassow, Mrs. Mabel Roberts, Mrs. Elizabeth Pfeuller, Miss Elaine Spencer, Mrs. Mary Jane Wise, Mrs. June Punte.

West Genessee Central Schools, N.Y.

Onondaga Road School

Principal: Miss Louise Smith. Secretaries: Mrs. Anne Keegan, Mrs. Helen Wood. Teachers: Miss Jean Galvin, Miss Virginia Sullivan, Miss Nancy Connolly.

Warners School

Principal: Mr. Reid Pringle. Secretary: Mrs. Gertrude Andreola. Teacher: Mrs. Joan Billington.

Rome State School, Rome, N.Y.

Director: Dr. Charles Greenberg. Educational Director: Mr. Gordon Shachoy. Educational Supervisor: Mr. Joseph Searow.

Syracuse State School, Syracuse, N.Y.

Director: Dr. Arthur G. Rodgers. Assistant Director: Dr. Lloyd E. Watts. Educational Supervisor: Miss W. Helen Cashore.

APPENDIX B

SUBJECTS LISTED BY BASE CELLS:

SCHOOL, MENTAL AGE, CHRONOLOGICAL AGE, INTELLIGENCE QUOTIENT, AND SEX

Public School Retarded Group

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell one	B1-008	01	117	154	076	M
	B1-060	07	110	196	061	M
	B1-042	20	104	171	063	M
	B1-049	20	109	171	066	M
	B1-051	19	124	194	069	F
	B1-055	14	136	182	075	F
	B1-081	07	116	178	068	F
	B1-138	09	134	190	075	F
Base cell two	B1-002	09	119	181	069	M
	B1-017	05	124	199	069	M
	B1-025	12	112	163	070	M
	B1-110	15	115	173	069	M
	B1-118	19	128	197	071	M
	B1-120	15	118	176	067	F
	B1-123	04	105	151	070	M
	B1-144	12	118	165	073	F
Base cell three	B1-016	14	130	185	074	F
	B1-040	07	111	181	064	M
	B1-054	07	101	173	058	F
	B1-061	14	132	176	078	M
	B1-075	14	126	194	070	M
	B1-076	02	109	148	074	M
	B1-128	07	112	177	066	M
	B1-097	07	114	174	068	F
Base cell four	B1-005	04	104	163	065	F
	B1-153	01	124	183	071	F
	B1-026	19	128	183	074	M
	B1-034	20	110	151	073	F
	B1-045	14	110	194	061	M
	B1-064	14	132	190	074	F
	B1-090	12	117	152	077	F
	B1-096	15	120	162	075	M

Public School Retarded Group (continued)

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell five	B1-073	07	111	187	063	F
	B1-078	14	124	177	073	M
	B1-117	12	109	163	068	M
	B1-112	19	108	172	065	M
	B1-135	15	119	168	073	F
	B1-014	17	100	166	062	F
	B1-058	14	132	191	074	F
	B1-070	12	102	157	065	F
Base cell six	B1-007	15	103	150	069	M
	B1-013	09	117	156	075	M
	B1-027	01	125	171	075	F
	B1-029	15	102	152	067	F
	B1-033	14	116	176	069	M
	B1-066	19	110	166	067	F
	B1-080	13	114	167	070	M
	B1-131	14	126	194	070	F
Base cell seven	B1-001	07	108	182	062	M
	B1-044	05	116	229	064	M
	B1-077	09	108	161	068	F
	B1-083	14	112	195	062	M
	B1-086	07	121	171	073	F
	B1-091	14	122	177	072	M
	B1-116	07	118	172	071	M
	B1-151	14	141	193	078	M
Base cell eight	B1-015	01	115	163	071	F
	B1-052	04	114	174	068	F
	B1-053	14	130	190	073	F
	B1-079	01	126	184	072	M
	B1-100	01	105	158	067	M
	B1-105	12	118	158	075	M
	B1-137	19	107	164	066	M
	B1-142	01	113	181	065	M

Public School Retarded Group (continued)

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell nine	B1-039	14	128	191	072	M
	B1-063	09	103	164	064	M
	B1-101	17	114	174	068	M
	B1-108	19	134	195	074	F
	B1-114	04	121	165	075	F
	B1-124	07	118	175	067	M
	B1-126	04	114	166	070	M
	B1-130	01	107	145	074	M
Base cell ten	B1-022	19	128	179	075	M
	B1-023	04	118	175	070	F
	B1-035	01	111	162	069	F
	B1-047	17	101	142	071	F
	B1-074	15	131	178	074	M
	B1-119	02	114	196	063	M
	B1-133	09	122	174	070	M
	B1-154	17	113	163	069	F
Base cell eleven	B1-021	12	110	155	071	F
	B1-030	04	100	173	060	M
	B1-059	04	118	173	071	F
	B1-087	19	124	176	073	F
	B1-089	07	114	179	064	F
	B1-098	14	134	190	075	M
	B1-111	07	106	172	061	F
	B1-127	19	125	172	075	F
Base cell twelve	B1-024	07	107	171	062	M
	B1-028	13	115	154	075	F
	B1-031	19	120	177	068	M
	B1-043	01	116	177	069	F
	B1-062	07	125	170	073	M
	B1-068	14	132	177	078	M
	B1-072	01	109	165	067	F
	B1-139	12	104	153	068	F

Public School Normal Group

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell one	B2-014	07	123	118	104	F
	B2-019	01	109	102	107	F
	B2-046	16	103	110	094	F
	B2-055	12	120	115	104	F
	B2-060	07	121	113	107	F
	B2-066	16	133	118	113	F
	B2-083	07	124	114	109	M
	B2-086	16	099	113	088	M
Base cell two	B2-029	09	129	123	105	M
	B2-004	09	129	117	110	F
	B2-012	12	108	106	102	M
	B2-016	09	134	122	110	M
	B2-058	12	111	114	097	F
	B2-074	16	096	095	101	F
	B2-085	01	118	108	109	M
	B2-092	01	127	114	111	F
Base cell three	B2-011	16	138	127	109	M
	B2-013	16	105	117	090	F
	B2-026	16	120	127	095	M
	B2-045	07	128	128	100	M
	B2-070	12	105	115	091	M
	B2-072	01	117	113	104	F
	B2-077	08	112	101	111	M
	B2-097	06	112	109	103	F
Base cell four	B2-007	12	109	105	104	F
	B2-020	03	114	120	095	F
	B2-032	03	099	090	110	F
	B2-039	12	123	110	112	M
	B2-064	16	111	108	103	M
	B2-065	07	127	116	109	F
	B2-069	09	131	120	109	M
	B2-090	08	120	107	112	M

Public School Normal Group (continued)

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell five	B2-031	16	102	099	103	M
	B2-035	08	134	135	099	F
	B2-044	16	108	102	106	M
	B2-050	03	126	113	112	M
	B2-052	07	119	111	107	F
	B2-057	06	113	113	100	F
	B2-076	16	120	112	107	F
	B2-091	16	112	113	099	M
Base cell six	B2-028	16	136	126	108	F
	B2-033	12	104	115	090	M
	B2-036	09	111	109	102	M
	B2-041	03	125	112	113	F
	B2-062	01	114	106	108	F
	B2-073	08	104	094	111	F
	B2-082	03	112	113	099	M
	B2-098	07	128	117	109	F
Base cell seven	B2-008	08	132	122	108	M
	B2-015	16	126	130	097	M
	B2-024	16	119	108	110	F
	B2-049	12	101	103	098	M
	B2-051	16	10[illegible]	123	088	M
	B2-053	16	112	126	089	F
	B2-054	03	122	127	096	F
	B2-059	16	116	121	096	M
Base cell eight	B2-017	16	125	134	093	M
	B2-023	12	112	109	103	F
	B2-047	03	121	113	107	M
	B2-061	12	098	100	098	M
	B2-067	03	118	123	096	F
	B2-087	03	122	119	103	M
	B2-088	12	111	115	097	M
	B2-100	16	116	103	113	F

Public School Normal Group (continued)

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell nine	B2-009	16	122	122	100	M
	B2-010	03	140	133	105	F
	B2-018	12	099	102	097	M
	B2-038	03	130	130	100	F
	B2-043	12	097	111	088	F
	B2-075	03	120	110	109	M
	B2-079	06	111	112	099	F
	B2-084	16	116	117	099	F
Base cell ten	B2-001	16	097	103	094	M
	B2-002	16	139	126	110	M
	B2-006	16	129	114	113	M
	B2-030	12	103	109	094	F
	B2-048	09	121	113	107	M
	B2-063	08	132	132	100	F
	B2-071	16	107	118	091	F
	B2-094	16	109	098	111	M
Base cell eleven	B2-003	16	126	124	102	M
	B2-005	01	111	116	096	M
	B2-022	06	113	104	109	F
	B2-025	07	119	114	104	M
	B2-040	16	110	116	095	M
	B2-056	16	112	118	095	F
	B2-080	16	118	131	090	M
	B2-096	16	125	123	102	M
Base cell twelve	B2-021	16	111	119	093	M
	B2-027	03	126	126	100	F
	B2-034	16	108	103	105	M
	B2-037	16	100	099	101	M
	B2-068	16	129	118	110	M
	B2-078	16	110	114	088	M
	B2-089	16	112	115	097	M
	B2-093	03	139	123	113	F

Public School Superior Group

	Subject Code No.	School Code No.	MA (Mos.)	Ca (Mos.)	IQ	Sex
Base cell one	B3-006	18	134	103	130	M
	B3-013	06	134	109	123	M
	B3-021	10	132	101	131	M
	B3-026	06	131	103	127	M
	B3-040	16	118	097	122	F
	B3-042	03	106	088	120	F
	B3-056	10	125	093	136	F
	B3-062	06	130	103	126	M
Base cell two	B3-007	08	112	087	129	F
	B3-024	10	115	093	124	M
	B3-031	08	118	095	124	M
	B3-044	16	127	106	129	M
	B3-054	08	135	100	135	F
	B3-065	08	132	108	122	F
	B3-086	08	135	103	131	M
	B3-091	10	140	105	133	M
Base cell three	B3-018	16	122	100	122	M
	B3-068	16	131	099	132	F
	B3-070	16	117	091	128	M
	B3-073	08	126	098	129	F
	B3-078	08	113	086	131	M
	B3-080	06	137	112	122	M
	B3-089	08	132	108	122	M
	B3-098	06	132	109	121	F
Base cell four	B3-005	10	139	115	121	M
	B3-009	18	127	101	127	F
	B3-010	08	120	089	135	M
	B3-035	08	122	090	136	F
	B3-053	16	133	088	151	F
	B3-055	07	118	097	122	F
	B3-076	10	119	086	142	F
	B3-087	06	133	105	127	F

Public School Superior Group (continued)

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell five	B3-002	01	137	113	121	M
	B3-027	08	129	099	130	F
	B3-030	03	113	087	126	M
	B3-049	10	116	088	132	M
	B3-058	01	140	117	120	M
	B3-059	08	124	101	123	F
	B3-072	16	122	101	121	M
	B3-095	18	140	101	139	M
Base cell six	B3-008	10	119	098	135	F
	B3-016	03	137	096	143	M
	B3-033	18	119	098	122	F
	B3-050	03	112	088	127	F
	B3-057	16	126	086	147	M
	B3-067	12	121	098	123	F
	B3-075	06	140	113	124	M
	B3-085	03	137	116	118	M
Base cell seven	B3-022	18	119	099	123	F
	B3-023	08	115	085	137	M
	B3-032	03	136	100	136	F
	B3-034	16	115	089	129	F
	B3-061	06	134	107	125	M
	B3-066	06	140	109	128	M
	B3-090	16	122	101	121	M
	B3-096	08	135	107	126	F
Base cell eight	B3-043	08	116	099	117	M
	B3-045	10	131	090	145	M
	B3-046	03	118	086	137	F
	B3-052	09	138	117	118	F
	B3-071	10	123	105	117	F
	B3-092	06	132	108	122	F
	B3-093	08	129	102	126	M
	B3-103	06	138	107	130	M

Public School Superior Group (continued)

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell nine	B3-014	18	133	104	128	M
	B3-017	18	124	097	128	F
	B3-029	16	119	095	125	M
	B3-038	03	129	087	148	F
	B3-041	08	120	100	120	F
	B3-048	16	135	094	145	F
	B3-077	08	140	094	149	M
	B3-083	10	117	090	130	M
Base cell ten	B3-003	03	138	101	137	F
	B3-047	08	124	103	120	F
	B3-060	03	105	090	117	F
	B3-102	06	138	097	155	M
	B3-074	06	132	109	121	M
	B3-081	16	115	093	124	F
	B3-082	08	139	105	132	M
	B3-101	08	114	092	124	M
Base cell eleven	B3-004	06	137	113	121	M
	B3-011	03	127	087	146	F
	B3-012	10	110	089	124	M
	B3-015	08	132	098	135	F
	B3-028	18	118	098	120	F
	B3-069	08	115	090	128	F
	B3-094	10	132	096	138	F
	B3-097	10	139	091	153	M
Base cell twelve	B3-001	03	123	094	132	M
	B3-020	18	134	107	125	M
	B3-036	18	127	106	120	F
	B3-037	06	119	099	121	M
	B3-051	06	135	105	129	F
	B3-064	16	122	092	133	F
	B3-079	16	121	093	130	F
	B3-099	16	131	093	141	M

Institutional Retarded Group

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell one	B4-071	21	123	183	071	M
	B4-070	21	118	200	066	M
	B4-084	21	099	185	057	F
	B4-022	22	130	197	072	F
	B4-011	22	125	167	077	F
	B4-075	22	120	183	069	M
	B4-069	21	119	199	066	M
	B4-032	22	103	181	060	F
Base cell two	B4-013	22	105	175	062	M
	B4-094	21	127	204	071	F
	B4-086	21	123	206	068	M
	B4-056	21	106	188	060	M
	B4-091	21	101	161	064	F
	B4-026	22	106	156	068	F
	B4-051	22	125	190	070	M
	B4-060	21	132	203	073	F
Base cell three	B4-089	21	131	205	073	M
	B4-065	21	134	201	074	M
	B4-019	22	109	186	062	F
	B4-014	22	099	162	062	M
	B4-041	22	126	212	070	F
	B4-074	22	102	210	057	F
	B4-097	21	109	174	065	M
	B4-099	21	106	204	059	F
Base cell four	B4-009	22	112	160	070	F
	B4-100	21	105	183	060	F
	B4-008	22	108	177	064	F
	B4-024	22	122	176	072	M
	B4-023	22	099	181	057	M
	B4-057	21	118	191	066	M
	B4-030	22	119	182	069	F
	B4-081	21	138	209	077	M

Institutional Retarded Group (Continued)

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell five	B4-067	21	134	193	074	M
	B4-007	22	104	151	069	F
	B4-018	22	102	157	065	F
	B4-016	22	110	177	065	F
	B4-083	21	115	168	070	F
	B4-002	22	132	194	073	F
	B4-043	22	126	195	070	M
	B4-072	21	114	203	063	M
Base cell six	B4-001	22	117	172	070	F
	B4-017	22	119	198	066	F
	B4-029	22	105	168	064	F
	B4-027	22	102	191	057	F
	B4-087	21	114	193	063	M
	B4-010	22	123	174	073	F
	B4-093	21	136	207	076	F
	B4-047	22	107	169	065	M
Base cell seven	B4-068	21	114	188	064	M
	B4-003	22	108	164	067	F
	B4-004	22	139	189	078	F
	B4-055	21	108	177	064	M
	B4-020	22	126	193	070	F
	B4-054	21	107	190	060	M
	B4-092	21	099	193	055	F
	B4-031	22	114	185	065	F
Base cell eight	B4-078	21	121	184	069	M
	B4-045	22	103	164	064	F
	B4-062	21	128	185	073	M
	B4-079	21	119	185	068	M
	B4-015	22	110	186	062	F
	B4-012	22	131	177	077	M
	B4-035	22	105	185	060	M
	B4-095	21	099	165	061	M

Institutional Retarded Group (Continued)

	Subject Code No.	School Code No.	MA (Mos.)	CA (Mos.)	IQ	Sex
Base cell nine	B4-033	22	106	175	063	M
	B4-036	22	110	180	062	M
	B4-044	22	112	183	064	M
	B4-073	22	126	181	073	M
	B4-046	22	124	174	074	M
	B4-039	22	113	202	066	F
	B4-052	21	109	187	062	M
	B4-098	21	103	212	060	F
Base cell ten	B4-053	21	121	201	067	M
	B4-085	21	109	174	065	M
	B4-080	21	103	187	061	F
	B4-042	22	114	211	063	F
	B4-006	22	107	169	065	F
	B4-049	22	110	172	066	M
	B4-082	21	138	209	077	M
	B4-101	21	109	170	066	F
Base cell eleven	B4-034	22	129	164	074	M
	B4-066	21	110	210	061	M
	B4-063	21	102	201	057	M
	B4-096	21	110	155	072	M
	B4-038	22	115	180	067	F
	B4-058	21	128	206	071	M
	B4-050	22	102	166	063	M
	B4-088	21	134	201	074	M
Base cell twelve	B4-064	21	144	219	080	M
	B4-040	22	100	189	056	F
	B4-059	21	132	202	073	M
	B4-076	22	112	162	070	F
	B4-090	21	111	190	062	F
	B4-048	22	101	163	062	M
	B4-025	22	104	182	060	M
	B4-061	21	119	192	066	M

APPENDIX C

THE DISCRIMINATION LEARNING VERBAL TASK:

MATERIALS, CONSTRUCTION, PROCEDURE, AND DIRECTIONS

Materials

Presented below are the combinations of cue words and response alternates arranged according to the order in which they were presented to the subjects during the example and 24 trials of the Discrimination Learning Verbal Task. In the actual presentation, each item was typed on a separate card.

Example

A.	fespon	efkomz	sonkax	caysef	poslug
B.	fespon	zestor	topfub	krifon	nasyoc
C.	fespon	tesamp	klofyn	nusdeg	kloafs
D.	fespon	byosan	enkrox	puforg	sohezb

Trial Number	Item	Cue Word	Response Alternates			
1.	a.	brafen	bwadex	bavguf	jaxemb	wahenj
	b.	gitsum	bivsrt	kygmrs	wospum	gmidav
	c.	kovjel	nakjoq	wekajy	vaxkeh	brokyl
2.	a.	gitsum	tucjin	gymcun	grubix	sibmoz
	b.	kovjel	lanjuk	dijzoe	qhoven	pijwok
	c.	brafen	cnubex	grezaw	anbivs	facung
3.	a.	kovjel	wajkyv	jrskod	holezg	jodvaz
	b.	brafen	rehboq	nadrum	nujfez	nehawn
	c.	gitsum	gnihsy	gatemp	gavsij	mujinx
4.	a.	kovjel	gerzjo	kedohm	lykbaj	vegkuh
	b.	gitsum	mugdyx	tvuseq	gigmow	wugmax
	c.	brafen	rifuvb	pobnrs	canpex	barpoz
5.	a.	gitsum	husorg	zigsec	ghetuk	gehmuj
	b.	brafen	nerizg	pabnuz	cerymf	adrybz
	c.	kovjel	romkes	vujemb	vonkim	qerlox
6.	a.	brafen	rinham	farwiq	brahom	berpos
	b.	gitsum	hispun	migcax	pmukat	huvgos
	c.	kovjel	vnewrl	gijver	wogkec	gukjav
7.	a.	gitsum	dixguv	midzuv	hicumz	ditmox
	b.	brafen	frawyh	kydnar	subenq	radcem
	c.	kovjel	cosljn	dakomv	ojriks	rhevob
8.	a.	brafen	rybnov	nosfrj	myrbez	gerdnv
	b.	kovjel	qijkov	krevuc	jbewml	navzoe
	c.	gitsum	gidurn	vumysq	qimjas	wigdyt
9.	a.	kovjel	erjavp	licjow	zevhik	nrkveg
	b.	brafen	zemnif	krejnx	juranx	arnjip
	c.	gitsum	dixpug	myrsud	tramuj	sybgem

10.	a.	brafen	junbav	vibarg	nibroc	gdefax
	b.	gitsum	gbytuh	wazgus	jupdig	esinux
	c.	kovjel	jiscoe	jeqomn	pexojs	lepkih
11.	a.	gitsum	gomsib	pogimb	cagvis	tsicnj
	b.	kovjel	sijkeh	vlecax	vpehox	qexork
	c.	brafen	bgersk	binjax	fyronk	qedanv
12.	a.	kovjel	yiksoj	zovkuc	woknuv	jivaxl
	b.	gitsum	qigmaj	kwimvt	kumwij	zibmeg
	c.	brafen	nyrisb	wendaq	girbaw	bwinsf
13.	a.	kovjel	osgavj	vloniq	wavjyk	vabdej
	b.	gitsum	twegsd	bamgir	secguk	kymgix
	c.	brafen	nirhek	cegnaj	fumbor	abrodz
14.	a.	gitsum	sikgav	jukipt	supweg	cogump
	b.	brafen	sekamb	nabcop	macdep	revpyf
	c.	kovjel	yohesk	secvyl	krowez	povjyd
15.	a.	brafen	wobrin	knofaq	kebnys	coranz
	b.	gitsum	mihsez	gusmyc	mogwuz	zitgov
	c.	kovjel	wegrov	vakdro	pibkej	lukvix
16.	a.	gitsum	swegnt	gesiko	smajix	sobgiz
	b.	brafen	jeharc	jademf	kenpro	angrum
	c.	kovjel	ivjomn	berkuv	ogvidl	kremox
17.	a.	brafen	bnehuq	vyrnes	prabik	bofnmk
	b.	kovjel	crekiv	lykvud	kijcez	kivoga
	c.	gitsum	huvqim	stomdx	birsym	drugiq
18.	a.	kovjel	kaloms	hakvij	uvojac	ivjaks
	b.	brafen	drynax	basewx	werhax	fabhok
	c.	gitsum	wiquvs	tagihq	sukirp	sigbor
19.	a.	brafen	vaqerx	fparyx	bedavc	perbic
	b.	gitsum	punsij	hugmep	tumhyq	lumjin
	c.	kovjel	hopeiv	wavojm	lejpyk	kobjax
20.	a.	gitsum	nimkux	smyhud	mospyt	symgos
	b.	kovjel	drojex	jubkal	bozerv	ukavij
	c.	brafen	haresk	vahenp	nahquf	majesq
21.	a.	kovjel	sekmoy	jepviz	hexgov	vulpmj
	b.	brafen	defbip	qebvor	nevbuq	nurbys
	c.	gitsum	stuzac	desgom	magsok	mivunj
22.	a.	kovjel	vgohdl	cemvuj	sivjak	scorej
	b.	brafen	ryxbof	gawbeq	jiburn	gybrek
	c.	gitsum	wiksag	wemzus	wubisc	zibunt
23.	a.	brafen	gnurpa	wekans	nifbuz	vycban
	b.	gitsum	gysemq	mysgep	buxtag	qimdag
	c.	kovjel	qivkyc	bojnav	vylkuz	hijesk

24.	a.	gitsum	smacgo	surmyn	humgec	tycmrg
	b.	brafen	fsibec	zebnaw	zenbug	cronyb
	c.	kovjel	lkezdr	juvmoy	qoskij	hojiks

All syllables were typed in lower case letters on a primary size typewriter (Trade name: The Sight Saver -- 16 point type, 6 letter pitch). The items --cue word and 4 response alternates -- were typed on 5" x 8" white unlined cards, one item per card. The line of words was centered horizontally on the card; the cue word was 1/4" from the left margin, the first alternate was 1/2" from the cue word, and the 4 alternates were spaced equidistantly. The several sets of 72 typed item cards were reproduced by the multilith process.

Construction

Each of the positive stimuli -- f, l, and t -- was imbedded in 24 six letter nonsense syllables. These were designated the positive words. In addition to the positive stimulus, each positive word contained 2 other letters from the cue word. Excluding the stimulus letters, the remaining 5 letters in the cue word could be arranged in these 20 two-letter combinations.

k-o-v-j-e- 1-2-3-4-5		b-r-a-e-n- 1-2-3-4-5		g-i-s-u-m- 1-2-3-4-5
1-2	2-1	3-1	4-1	5-1
1-3	2-3	3-2	4-2	5-2
1-4	2-4	3-4	4-3	5-3
1-5	2-5	3-5	4-5	5-4

To obtain the required 24 combinations, the 20 combinations were written on cards and shuffled. Four cards were drawn and the combinations were added to the list.

Each positive word was completed by adding three letters chosen from the remainder of the alphabet (excluding the positive stimuli); each consonant was used an approximately equal number of times while the vowels were used more often.

The location of the positive stimulus in the word occurred with equal frequency in the initial, medial, and final positions. The randomized list of stimulus words thus derived and the respective cue words are presented in the following lists.

brafen

initial	medial	final
facung	nujfez	bavguf
farwiq	rifuvb	cerymf
frawyh	nosfrj	zemnif
fyronk	gdefax	bwinsf
fumbor	knofaq	revpyf
fabhoh	bofmnk	jademf
fparyx	defbip	nohquf
fsibec	nifbuz	ryxbof

kovjel

initial	medial	final
lkezdr	holezg	brokly
lejpyk	qerlox	vgohdl
lykvud	coxljn	jubkal
lukvix	vlecax	ogvidl
lepkih	vloniq	secvyl
licjow	kalcms	jivaxl
lykbaj	vulpmj	jbeuml
lanjuk	vylkuz	vnewrl

gitsum

initial	medial	final
tramuj	gatcmp	bivsrt
tucjin	ghetuk	pmukat
tvuseq	ditmox	wigdyt
tsicnj	gbytuh	kwimvt
twegsd	zitgov	jukipt
tycmrq	stcmdx	swegnt
tumhyq	stuzac	mospyt
tagihq	buxtag	zibunt

Seventy-two additional words were constructed to correspond to each cue word and to the 24 positive words. These were designated the negative words. The negative words included 3 letters from the cue words (excluding the positive stimuli). Listed below are the 60 possible combinations of three letters which could occur.

k-o-v-j-e- 1-2-3-4-5		b-r-a-e-n- 1-2-3-4-5		g-i-s-u-m- 1-2-3-4-5
123	213	312	412	512
124	214	314	413	513
125	215	315	415	514
132	231	321	421	521
134	234	324	423	523
135	235	325	425	524
142	241	341	431	531
143	243	342	432	532
145	245	345	435	534
152	251	351	451	541
153	253	352	452	542
154	254	354	453	543

The 12 additional combinations needed to construct the 72 words were obtained by writing the above 60 combinations on cards, shuffling them, drawing 12 cards, and adding the combinations to the list.

Added to the three letters from the cue word were three letters selected from the remainder of the alphabet (excluding the positive stimuli); again, each consonant was used an approximately equal number of times while the vowels were used more often. The syllables containing the several combinations of letters were arranged in random order. The respective groups of negative words are contained in the following lists.

brafen

cnubex
grezaw
anbivs
rinham
brahom
berpos
kydnar
subenq
radcem
bgersk
binjax
qedanv
nirhek
degnaj
abrodz
drynax
bazewx
werhax

vaqerx
bedavc
perbic
zebnaw
zenbug
cronyb
rehboq
nadrum
nehawn
pobnrs
canpex
barpoz
rybnov
myrbez
gerdny
junbav
vibarq
nibroc

wobrin
kebnys
coranz
bnahuq
vyrnes
prabik
qebvor
nevbuq
nurbys
gnurpa
wekans
vycban
buadex
jaxemb
wahenj
nerizq
pabnuz
adrybz

krejnx
juranx
arnjip
nyrisb
wendaq
girbaw
sekamb
nabcop
macdep
jeharc
kenpro
angrum
haresk
vahemp
najesq
gaubeq
jiburn
gybrek

kovjel

juvmoy
qoskij
hejiks
hopeiv
wavojm
kobjax
crekiv
kijcez
kivoga
wegrov
vakdro
pibkej
jiscoe
jeqomn
pemojs
erjavp
zevhik
nrkveg

gerzjo
kedohm
vegkuh
dijzoe
qhoven
pijwok
wajkyv
jrskod
jodvaz
romkes
vujemb
vonkim
dakomv
ojriks
rhevob
sijkeh
vpehox
qexork

osgvaj
wavjyk
vablaj
hakvij
uvojac
ijvaks
sekmoy
jepviz
hexgov
qivkyc
bojnav
hijesk
nakjoq
wekajy
vaxkeh
camvuj
sivajk
scorej

drojex
bozerv
ukavij
ivjomn
berkuv
kremox
yohesk
krowez
povjyd
yiksoj
zovhuc
woknuv
qijkuv
krevuc
novzoe
gijver
wogkec
gukjav

gitsum

dixpug
myrsud
sybgem
gymcun
grubix
sibmoz

punsij
hugmep
kumjin
wiquvs
sukirp
sigbor

mihsez
qusmyc
mogwuz
hubqim
birsym
drugiq

gidurn
vumysq
qimjas
qigmaj
kumwij
zibmeg

mugdyx
gigmow
sugmax
qomsib
pogimb
cagvis
bamgir
secguk
kymgix
smacgo
surmyn
humgec

gnihsy
gavsuj
mujinx
husorg
zigsec
gehmuj
dixguv
midzuv
hicumz
wazgus
jupdig
esinux

desgom
magsok
mivunj
gysemq
mysgep
qimdag
dygmrs
waspum
gmidav
hispun
migcax
huvgos

sikgav
supweg
cogump
gesiko
smajix
sobgiz
nimlux
smyhud
symgos
wiksag
wemzus
wubsic

A trial consisted of 3 items, one item corresponding to each stimulus sound. To prevent any systematic sequences from occurring over the 24 trials of the task, irregular orders were employed in the vertical arrangement of the cue words and in the horizontal arrangement of the positive words.

Procedure and Directions

Discrimination Learning Verbal Task

brafen -- f; kovjel -- l; gitsum -- t.

This task involves discrimination learning. The subject must learn to respond differentially to similar stimuli; that is, he must respond to the f, l, and t sounds and fail to respond to the other sounds contained in the cue words. Be sure that the subject understands this process while and after working the example. If at any point during the task the subject appears confused about what is expected of him, reiterate the explanation.

Scoring, including time and number of responses per trial, is performed as follows. Timing: begin the stop watch when the first word on the card is read. Stop the watch when the correct response is made. The attainment time is the cumulative time (rounded to the nearest second) for the three items of the trial. Reported time is the attainment time + 100. Number of responses: for each item, designate an incorrect response with a check and a correct response with an X; record the total number of responses made on the three items.

The procedure and directions to be used with the subjects appear below.

Here is a letter test. These cards are an example. We will work it together so you will know how to do this one.(Indicate main task.)

See this word which has a line under it. It is not a real word. These words that you see are not real words. They are just letters put together to look like words. Look at the letters in this word (Indicate fespon.) What are the letters in fespon?(Have subject enumerate the letters.) That's right.

Now look at these four words (Indicate line of words following fespon.) They all have some of the letters which are in fespon. What are the letters which are the same in this word (Indicate first word.) and fespon? (Have subject enumerate the three letters which are the same; if he does not, point out the three letters that are the same. Repeat for second, third, and fourth words in the line.)

In this test you are going to find a letter I am thinking of. I will be thinking of a letter in this word (Indicate and say fespon.), so you know I am thinking of either the f, e, s, p, o, or n.

The letter I am thinking of is also over among these words (Indicate 4 nonsense syllables to right of fespon.) Choose one of these words, just by guessing. If it has the letter I am thinking of I will say yes, that word has the letter I am thinking of; if it doesn't have the letter I am thinking of, I will say no, guess again. Then you guess until you find the one which has the letter I am thinking of.

Begin example

(Read first line of words. Have subject make choice. If incorrect one is chosen have subject enumerate the letters which are the same as some of the letters.) You have found out something. Which letters are the same in fespon and this word? I will never be thinking of any of those letters when you see fespon. (Continue in this manner until the correct choice is made. When the correct choice is made--) Yes, that word has the letter I am thinking of. (Have the subject enumerate the letters in fespon.) Now you know that it is one of those letters that I am thinking of. But, remember, in some of your other guesses you found out what letters it couldn't be.

Now look at the next line. Remember, I will be thinking of the same letter each time. I'll read this line to you. (Read second line of words.) Now which word has the letter I am thinking of? (Investigator responds yes or no. If the subject responds correctly--) Which letters are the same? Remember which letters were the same last time. Next time try to remember those letters and choose a word which has those letters. That will help you get it right.

(Follow the same procedure for lines 3 and 4. After line 3, ask--) Which letter do you think it is? If correct letter is chosen--) Yes, each time you see the word which has that letter, choose that word the first time. (If the incorrect letter is chosen, put out first three cards. Show how p was the letter which was the same on all three cards.) You have to find the letter which is the same for all the words.

Now we will go on to the main test. We will make it a little harder. This time we have 3 words: brafen (Show the word.), gitsum (Show the word.), and kovjel (Show the word.) I will be thinking of one letter for brafen, one letter for gitsum, and one letter for kovjel. I will be thinking of the same letter for each word each time you see the word. (Elaborate.) Each time you see brafen, I will be thinking of the same letter. (Repeat for gitsum and kovjel.) Remember you have to find 3 letters. You will not tell me the letters though. I will know you are thinking of the right letter when you choose the right word each time. Any questions? (If so, explain further; if not, begin this task.)

Speed and Accuracy Directions

Now you know what to do. You are to try to get them all right as quickly as you can. Sometimes your teacher may ask you to work as fast as you can or to do as many as you can. Then you try to get all of the problems right as fast as you can. Well, that's what you are supposed to do with this test. The faster you can do them right, the better score you make.

Begin Trial One

Now let's begin the first trial. (Read the line of nonsense syllables. Have the subject respond. If the response is incorrect--) No, that word does not have the letter I am thinking of; choose again. (When the correct response is made--) Yes, that word has the letter I am thinking of. Now look at the first word (Indicate cue word.) and this word (Indicate correct response.) Which letters are the same? Do not tell me. Just try to remember it. (Repeat this procedure for the other two items of the trial.)

Performance Information--Speed and Accuracy Control

That trial took you ______seconds (Reported score = attainment time +100.). Your score was ______seconds. You got them all right in ______ seconds.

Begin Trial Two

Here is the next trial. Remember you are supposed to get all of the problems right as fast as you can. The less time you take, the faster you are, and the faster you do the problems right the better score you get. I'll know that you know the letter when you tell me the right word on your first choice.

Performance Information--Speed and Accuracy Control

(Repeat comments used above pertinent to performance information.)

Trials Two Through Eight

(Continue this same procedure for task administration, speed and accuracy directions, and speed and accuracy control performance information.)

Reinforcement Schedule

C6 (D1 and D2): for the remaining trials, continue this same procedure for task administration, etc.

C1--C5 (D1 and D2): at the end of trial 8, administer the level of aspiration directions.

C5 (D1 and D2): for the remaining trials, continue procedure for task administration, speed and accuracy directions, and level of aspiration directions, and administer level of aspiration control performance information.

C1--C4 (D1 and D2): for the remaining trials, continue procedure for task administration, speed and accuracy directions, level of aspiration directions, and administer, in appropriate cases, the respective sets of differential success and failure performance information.

References

McClelland, D. C. Studies in serial verbal discrimination learning. II. Retention of responses to right and wrong words in a transfer situation. *J. exp. Psychol.*, 1942, 31, 149-162.

APPENDIX D

THE DISCRIMINATION LEARNING NON-VERBAL TASK: MATERIALS, CONSTRUCTION, PROCEDURE, AND DIRECTIONS

Materials

The Discrimination Learning Non-Verbal Task items as they were arranged for presentation to the subjects are grouped below according to trials. The total task included an example and 18 trials. The task booklet consisted of 19 pages; each trial and the example appeared on a separate page.

Example

	2		9		6	
157	328	815	134	473	197	308

Trial 1

	2		9		6	
503	155	684	433	490	302	357
718	307	170	210	747	500	110
435	838	568	109	331	431	117
841	953	340	328	585	516	388
747	114	705	514	604	740	801
597	782	184	385	708	834	860
779	570	442	334	175	235	505
136	723	771	953	553	709	350
443	885	717	507	482	394	380
140	317	632	718	457	815	884

Trial 2

	2		9		6	
735	458	518	175	734	453	521
836	948	552	184	850	492	713
633	711	715	343	840	337	287
740	470	135	705	171	759	165
834	413	783	581	524	316	387
835	971	480	858	304	770	891
310	787	654	578	732	141	540
832	509	717	167	274	447	454
375	387	850	575	951	823	443
473	814	453	307	184	476	808

Trial 3

	2		9		6	
344	537	389	375	847	840	867
181	140	245	538	817	843	324
535	755	407	937	876	707	805
537	194	350	102	147	141	705
873	615	749	341	453	557	280
305	181	467	132	751	931	304
313	506	745	503	877	478	808
323	473	682	710	873	891	454
715	412	185	371	510	458	137
360	354	158	889	715	254	833

Trial 4

	2		9		6	
427	713	375	981	416	540	770
812	145	384	379	547	341	360
105	531	170	277	813	483	440
714	753	787	758	932	856	423
134	311	530	398	310	153	573
650	435	845	373	742	545	278
314	537	567	708	519	170	811
183	345	834	489	740	715	376
571	984	425	584	750	878	745
783	412	651	183	371	393	578

Trial 5

	2		9		6	
408	215	547	344	530	145	753
579	855	867	350	833	806	350
940	103	515	488	715	524	790
378	674	784	414	811	780	174
152	588	464	471	349	314	131
235	705	747	757	813	136	137
128	734	475	951	540	545	535
833	502	373	614	471	118	552
388	740	393	783	748	578	710
481	233	383	381	418	865	439

Trial 6

	2		9		6	
790	470	731	480	653	538	518
174	882	177	867	830	139	373
873	234	743	143	480	135	758
801	135	308	948	576	474	357
558	320	547	432	741	397	484
185	635	380	814	580	145	303
408	810	210	318	718	709	530
865	250	578	817	144	504	953
456	754	344	521	645	354	851
330	375	542	755	478	493	150

Trial 7

	2		9		6	
440	905	585	127	583	376	158
745	474	344	845	374	537	488
654	893	802	530	148	704	460
804	273	151	340	744	719	535
854	455	324	150	810	438	988
547	715	110	307	416	850	595
531	732	138	857	650	751	747
314	108	140	849	384	367	748
274	838	548	475	383	727	914
535	110	386	818	185	454	751

Trial 8

	2		9		6	
154	307	410	860	257	713	539
300	810	301	316	128	838	340
305	930	781	514	189	742	474
418	530	648	507	351	811	591
104	378	543	805	710	804	448
217	414	863	439	513	346	781
170	988	427	430	370	748	705
872	138	517	737	310	830	504
618	454	393	453	567	130	875
489	571	380	203	705	710	149

Trial 9

	2		9		6	
853	671	135	485	896	812	358
340	508	727	848	501	145	743
230	850	361	313	780	199	814
901	507	336	810	355	824	753
435	307	841	613	402	840	718
375	538	451	598	171	275	438
743	374	530	550	154	851	168
839	940	717	525	584	180	308
485	145	376	858	378	531	844
473	673	137	302	791	715	550

Trial 10

	2		9		6	
768	371	203	751	740	730	108
834	519	705	713	988	408	143
571	300	310	850	823	846	538
643	389	482	713	171	873	484
550	394	715	840	560	813	308
139	831	455	248	457	148	544
150	414	387	151	721	356	951
574	718	574	310	712	854	871
597	507	840	637	163	788	440
387	835	245	809	305	105	300

Trial 11

	2		9		6	
743	795	586	230	110	310	401
650	511	875	470	352	571	154
598	353	803	654	440	758	749
130	314	838	154	740	244	173
361	519	614	332	837	308	480
501	188	418	891	711	503	149
458	800	705	710	180	237	341
160	835	400	718	351	324	473
574	180	546	908	780	344	193
450	144	641	812	507	570	853

Trial 12

	2		9		6	
409	867	800	188	710	537	380
738	407	274	141	938	848	504
345	738	180	723	346	815	808
482	784	892	308	811	615	574
398	175	519	710	348	761	875
233	785	158	530	450	730	587
530	357	524	984	438	105	186
800	370	700	191	772	134	645
475	847	538	371	538	567	188
448	384	470	577	211	783	159

Trial 13

	2		9		6	
850	547	374	413	782	593	143
804	604	530	549	161	135	280
474	585	711	350	504	375	481
975	801	483	540	306	571	458
785	721	531	507	731	895	347
407	875	142	643	503	338	300
544	589	734	213	360	413	170
180	141	810	470	805	307	740
428	935	754	856	850	714	172
173	587	593	814	178	619	430

Trial 14

	2		9		6	
305	448	783	168	835	145	270
543	119	405	536	345	401	715
574	955	458	833	147	827	458
803	581	490	770	305	173	312
810	637	784	147	140	214	489
365	457	537	380	830	310	475
758	140	736	538	125	385	985
101	408	588	838	373	893	452
384	645	480	510	745	478	184
877	761	370	507	549	234	435

Trial 15

	2		9		6	
607	785	398	738	348	702	857
470	830	101	150	845	370	765
104	438	819	708	234	588	427
580	301	471	746	958	480	147
800	718	504	457	135	745	182
840	315	590	370	671	157	242
168	538	841	348	305	708	480
439	738	576	470	815	457	435
980	580	183	824	140	798	485
715	152	578	408	810	43	618

Trial 16

	2		9		6	
318	307	581	890	980	403	754
327	135	176	845	530	733	404
352	153	347	194	401	647	515
207	114	450	813	480	745	464
380	549	121	758	477	185	106
912	730	486	854	344	654	837
590	780	185	340	834	514	832
413	189	487	563	147	505	583
845	307	281	748	930	136	830
103	375	327	403	780	518	711

Trial 17

	2		9		6	
178	843	300	419	701	564	541
350	230	418	727	745	834	148
356	588	515	374	984	507	371
138	102	617	493	538	884	757
483	810	413	837	275	150	578
134	368	838	711	589	484	141
878	800	508	856	971	311	574
125	442	894	181	110	807	748
650	407	354	573	308	830	139
585	357	765	245	475	440	177

Trial 18

	2		9		6	
332	407	481	814	537	751	618
187	378	597	703	171	764	538
130	231	858	431	341	709	116
733	140	157	478	328	315	914
573	837	470	683	895	457	737
355	412	858	185	153	234	405
174	463	471	814	738	349	757
103	343	180	527	911	736	840
745	127	347	140	738	352	711
590	150	310	675	581	488	540

All of the numbers were typed in lower case letters on a primary size typewriter (Trade name: the Sight Saver--16 point type, 6 letter pitch.)

Each trial, composed of 70 items, was typed on separate sheets of 8 1/2" by 11" white unlined bond paper. Each of the ten rows contained seven items. The seven rows were centered horizontally and spaced equidistantly vertically on the page.

Construction

Adapted for the purpose of this task were the several randomized ten digit number series developed by Woodworth and Wells (1911). When the task was being constructed, seven lines of 30 digits were listed. Each line was composed of three 10-digit series. The 30 digits were divided into 10 three-digit numbers. The numbers in which the 2, the 9, or the 6 appeared were designated as possible positive response alternates. Alterations were made so that only one positive stimulus occurred in any 10 digits. An irregular order was used to determine the sequence in which these positive stimuli occurred. In addition, the 3 digits in the remaining possible positive response alternates were rearranged so that each of the positive stimuli appeared with equal frequency in the initial, medial, and final positions.

For final presentation in the task format, the 70 three-digit numbers were arranged in ten rows with seven numbers in each row.

Procedure and Directions

Discrimination Learning Non-Verbal Task

This task involves discrimination learning. As such, the introductory comments to the Discrimination Learning Verbal Task apply here as well. Scoring is based on the following considerations. There are no number of responses scores. Check the subject's responses and point out all errors. (In general, there will be few non-chance errors.) To obtain the time scores, start the watch when the subject begins a trial and stop the watch when he indicates that he is finished. The total time rounded to the nearest second required to complete a trial is the attainment time. Reported time is the attainment time + 100. Included below are the procedures and directions to be used with the subjects.

This is a test using numbers. This first page is an example. See the numbers above the line: the 2, the 9, and the 6. Then see the groups of numbers below the line. Either the 2, the 9, or the 6 may be hidden in some of these groups of numbers. Your job is to cross out each group of numbers which has either a 2, a 9, or a 6 in it. Let's look at the first one. It's 1 - 5 - 7. Is one of the three numbers hidden in this group? No. Look at the second number group, 3 - 2 - 8. Do you see one of the hidden numbers? Yes, the 2 is hidden there. So you cross out that number group. (Continue through the line. Check to see that the subject is correct and be sure he understands the task.)

Now, let's look at the next page. This page is like the last one except there are more groups of numbers. Your job is to cross out every number group which has a hidden number in it. Look up at the top as often as you need to see what the hidden numbers are which you are looking for. Any questions? (If so, clarify. If not, begin the task.)

Speed and Accuracy Directions

Now you know what to do. You are to try to get them all right as quickly as you can. Sometimes your teacher may ask you to work as fast as you can or to do as many as you can. They you try to get all of the problems right as fast as you can. Well, that's what you are supposed to do with this test. The faster you can do them right, the better score you make.

Begin Trial One

Now let's begin the first trial. Cross out every number group which has a 2, a 9, or a 6 in it. You can look at the example at the top of the page as often as you need to.

Performance Information--Speed and Accuracy Control

That trial took you _______seconds. (Reported score= attainment time + 100.) Your score was _______seconds. You got them all right in _____ seconds.

Begin Trial Two

Here is the next trial. Remember you are supposed to get all of the problems right as fast as you can. The less time you take, the faster you are, and the faster you do the problems right the better score you get. Cross out every number group in which either the 2, the 9, or the 6 is hidden. Look at the top of the page as often as you need to.

Performance Information--Speed and Accuracy Control

(Repeat comments used above pertinent to performance information.)

Reinforcement schedule

C6 (D1 and D2): for the remaining trials, continue this same procedure for task administration, etc.

C1--C5 (D1 and D2): at the end of trial 2, administer the level of aspiration directions.

C5 (D1 and D2): for the remaining trials, continue procedure for task administration, speed and accuracy directions, and level of aspiration directions, and administer level of aspiration control performance information.

C1--C4 (D1 and D2): for the remaining trials, continue procedure for task administration, speed and accuracy directions, level of aspiration directions, and administer, in appropriate cases, the respective sets of differential success and failure performance information.

References

Woodworth, R. S. and Wells, F. L. Association Tests. *Psychol. Monogr.*, 1911, No. 57.

APPENDIX E

THE ROTE LEARNING VERBAL TASK: MATERIALS, CONSTRUCTION, PROCEDURE, AND DIRECTIONS.

Materials

The items included in the example, the demonstration, and the 24 trials of the Rote Learning Verbal Task are listed below in the order in which they were administered to the subjects. Separate cards were used for the respective sets of 5 items.

Example	Item	Stimuli	Responses
Demonstration	a.	dav	ceb
	b.	gex	koz
	c.	yad	fij
	d.	cim	bem
	e.	xud	rux
A.	a.	cim	
	b.	xud	
	c.	dav	
	d.	yad	
	e.	gex	
B.	a.	xud	
	b.	yad	
	c.	cim	
	d.	gex	
	e.	dav	
C.	a.	yad	
	b.	dav	
	c.	gex	
	d.	xud	
	e.	cim	

Trial Number	Item	Stimuli	Responses
Demonstration	a.	maz	wib
	b.	zic	kuh
	c.	bef	yot
	d.	coj	paf
	e.	giq	jeh
1.	a.	bef	
	b.	giq	
	c.	maz	
	d.	zic	
	e.	coj	
2.	a.	zic	
	b.	coj	
	c.	giq	
	d.	maz	
	e.	bef	

Trial Number	Item	Stimuli	Responses
3.	a.	giq	
	b.	maz	
	c.	coj	
	d.	bef	
	e.	zic	
4.	a.	coj	
	b.	bef	
	c.	zic	
	d.	giq	
	e.	maz	
5.	a.	giq	
	b.	coj	
	c.	bef	
	d.	zic	
	e.	maz	
6.	a.	coj	
	b.	zic	
	c.	maz	
	d.	bef	
	e.	giq	
7.	a.	bef	
	b.	maz	
	c.	giq	
	d.	coj	
	e.	zic	
8.	a.	maz	
	b.	coj	
	c.	zic	
	d.	giq	
	e.	bef	
9.	a.	zic	
	b.	giq	
	c.	bef	
	d.	maz	
	e.	coj	
10.	a.	giq	
	b.	bef	
	c.	maz	
	d.	coj	
	e.	zic	
11.	a.	bef	
	b.	giq	
	c.	maz	
	d.	zic	
	e.	coj	

Trial Number	Item	Stimuli	Responses
12.	a.	giq	
	b.	bef	
	c.	zic	
	d.	coj	
	e.	maz	
13.	a.	zic	
	b.	giq	
	c.	coj	
	d.	maz	
	e.	bef	
14.	a.	maz	
	b.	giq	
	c.	zic	
	d.	bef	
	e.	coj	
15.	a.	giq	
	b.	coj	
	c.	zic	
	d.	maz	
	e.	bef	
16.	a.	zic	
	b.	giq	
	c.	maz	
	d.	bef	
	e.	coj	
17.	a.	bef	
	b.	zic	
	c.	giq	
	d.	coj	
	e.	maz	
18.	a.	coj	
	b.	maz	
	c.	bef	
	d.	zic	
	e.	giq	
19.	a.	zic	
	b.	maz	
	c.	coj	
	d.	giq	
	e.	bef	
20.	a.	bef	
	b.	giq	
	c.	coj	
	d.	zic	
	e.	maz	

Trial Number	Item	Stimuli	Responses
21.	a.	giq	
	b.	zic	
	c.	bef	
	d.	maz	
	e.	coj	
22.	a.	maz	
	b.	coj	
	c.	zic	
	d.	bef	
	e.	giq	
23.	a.	maz	
	b.	zic	
	c.	bef	
	d.	coj	
	e.	giq	
24.	a.	bef	
	b.	coj	
	c.	maz	
	d.	zic	
	e.	giq	

All of the nonsense syllables were typed in lower case letters on a primary size typewriter (Trade name: The Sight Saver - - 16 point type, 6 letter pitch).

The set of 5 items in each trial was typed on a 5" by 8" white unlined card. The list of items was centered horizontally on the card; vertically, the items in the list were spaced equidistantly. On the demonstration card, there were 4 spaces between the stimulus-response pairs.

A multilith process was employed to reproduce the required number of sets of trial cards.

Construction

A total of 20 three-letter nonsense syllables was included in the example and Rote Learning Verbal Task *per se*. Each syllable was composed of consonants in the initial and final positions and a vowel in the medial position.

All of the syllables were selected from the composite list which Hilgard (1951) presented as containing syllables of low association value or meaningfulness.

The set of rules advanced by Hilgard for the construction of nonsense syllable lists was followed as closely as possible in the construction of the list of five paired associates used in the task proper. That is to say, the following conditions were observed.

1) A consonant appeared as the first letter of a syllable only once within the list.
2) A consonant appeared as the third letter of a syllable only once within the list.
3) No consonant appeared more than once in any four consecutive syllables.
4) Any two letters of one syllable in the list were not the same as any two letters of another syllable.
5) Alphabetical sequences of consonants did not exist from syllable to syllable and within syllables.
6) The syllables were chosen with reference to their degree of association value.

There was one exception to the rule that no vowel should occur more than once within any four consecutive syllables. In the list of stimuli it was necessary to use the vowel i twice; therefore, from trial to trial, as the vertical position of the syllables was irregularized, the two syllables containing the letter i occasionally appeared in closer proximity than that specified by the rule. In addition, the lists were not used as circular series; rather, the syllable positions were irregularized from trial to trial. However, with the exception noted, the rules were observed in all syllable orders employed.

As stated, the vertical position of the stimulus-response pairs was varied in an irregular order from trial to trial. The purpose of this procedure was to ensure that the subjects learned to associate the stimulus-response pairs rather than to produce the response syllables as a serial list.

Procedure and Directions

Rote Learning Verbal Task

This task involves the learning of arbitrary rote associations. The subject must learn to associate the several stimulus-response pairs of syllables. He demonstrates this acquisition by supplying in the specified time the response member for the stimulus member in whatever position it appears. He should understand the idea of this process during and after the example. If at any time during the task the subject appears confused about what is expected of him, reiterate the explanation.

Scoring will include time and the number of responses supplied per trial. Scoring is performed in the following manner. As the first stimulus syllable is pronounced, start the watch. Stop the watch when the subject supplies the correct response syllable or after 10 seconds if the correct response syllable is not supplied. If the subject does not supply the correct response syllable within 4 responses, credit him with 10 seconds and 4 responses. Repeat this procedure for the 5 stimulus-response pairs in each trial. The total number of responses score for each trial equals the sum of the number of responses for each of the 5 pairs which constitute the trial. The total attainment time for each trial equals the sum of the attainment time for each of the 5 items. Reported time equals the attainment time +150.

The procedure and directions to be employed with the subjects appear below.

This morning/afternoon we are going to play "word partners". This task is made up of 24 cards. On each card you will see 5 funny little words. Every card will have the same 5 words but they will be in different positions on all the cards.

Here are 4 sample cards. These are not the same words or word partners we will use but you may get an idea how we play "word partners". (Show example cards. Explain how the same words are on all the cards but in different positions. Read the word partners for the 5 example words:) dav-ceb; gex-koz; yad-fij; cim-bem; xud-rux.

(Explain if bem is the word partner for cim on card one, then bem must be the word partner for cim on the other 3 cards. Ask the subject,--) if koz is the word partner for gex on card one, what is the word partner for gex on card two? On card three? On card four?

Each word on a card has a word partner. In the test, I'll tell you what the word partners are before we start. The words on the cards will always have the same word partners no matter in what position you see the word.

When we start you will see only one card at a time. I'll say the words for you one at a time and you try and remember the word partner for that word.

If you cannot remember the word partner, I'll tell you the correct word partner for that word. Then we will go on to the next word on the card.

We will play until we finish all 24 cards. You are to try and see if you can bring the correct word partners together.

Remember, no matter in what positions the words are, the word partners always remain the same. Any questions? (If so, clarify the process further; if not, begin the task.)

Speed and Accuracy Directions

Now you know what to do. You are to try to get them all right as quickly as you can. Sometimes your teacher may ask you to work as fast as you can or to do as many as you can. Then you try to get all of the problems right as fast as you can. Well, that's what you are supposed to do with this test. The faster you can do them right, the better score you make.

Begin Trial One

Now let's begin the first trial. (Read the demonstration card containing the stimulus-response members to the subject. Then, expose to the subject the card containing only the stimulus members; read one item at a time. If the subject supplies an incorrect response, say --) No, that is not ___ ___'s word partner, etc. (If the subject does not supply the correct response within 10 seconds or within 4 items, supply it and proceed to the next item. Continue for the 5 items.)

Performance Information--Speed and Accuracy Control

That trial took you ______seconds (Reported score = attainment time +150.) Your score was ______seconds. You got them all right in ______seconds.

Begin Trial Two

Here is the next trial. Remember you are supposed to get all of the problems right as fast as you can. The less time you take, the faster you are, and the faster you do the problems right the better score you get.

Performance Information--Speed and Accuracy Control

(Repeat comments used above pertinent to performance information.)

Trials Two Through Eight

(Continue this same procedure for task administration, speed and accuracy directions, and speed and accuracy control information.)

Reinforcement Schedule

C6 (D1 and D2): for the remaining trials, continue this same procedure for task administration, etc.

C1--C5 (D1 and D2): at the end of trial 8, administer the level of aspiration directions.

C5 (D1 and D2): for the remaining trials, continue procedure for task administration, speed and accuracy directions, and level of aspiration directions, and administer level of aspiration control performance information.

C1--C4 (D1 and D2): for the remaining trials, continue procedure for task administration, speed and accuracy directions, level of aspiration directions, and administer, in appropriate cases, the respective sets of differential success and failure performance information.

References

Hilgard, E. R. Methods and procedures in the study of learning. Chapter 15 in Handbook of experimental psychology. S. S. Stevens (Ed.), New York: Wiley, 1951.

APPENDIX F

THE ROTE LEARNING NON-VERBAL TASK:
MATERIALS, CONSTRUCTION, PROCEDURE, AND DIRECTIONS.

Materials

Listed below are the items of the Rote Learning Non-Verbal task as they were organized for administration to the subjects. The total task included an example and 18 trials; when the task was administered to the subjects, each of these was contained on a separate page. The 19 pages were stapled together to form a task booklet.

Example

A	B	C	D	E	F	G	H	I
2	9	4	1	7	5	3	8	6

G	F	B	A	C	I	H	F	D

Trial 1

A	B	C	D	E	F	G	H	I
2	9	4	1	7	5	3	8	6

H	I	D	H	B	I	H	D	G

D	B	G	B	H	F	D	G	H

A	D	F	G	C	D	C	B	I

G	I	E	A	C	B	F	A	H

Trial 2

A	B	C	D	E	F	G	H	I
2	9	4	1	7	5	3	8	6

D	I	A	H	F	G	H	B	C

H	A	D	E	B	E	C	G	F

E	D	B	A	D	I	F	H	C

I	B	I	C	A	G	E	G	H

Trial 3

A	B	C	D	E	F	G	H	I
2	9	4	1	7	5	3	8	6

B	D	C	F	I	G	E	D	B

I	E	B	D	F	H	A	D	F

B	D	A	E	A	G	C	D	H

C	H	B	I	G	F	E	H	B

Trial 4

A	B	C	D	E	F	G	H	I
2	9	4	1	7	5	3	8	6

H	E	H	B	F	A	B	G	F

A	D	I	F	A	I	H	C	D

E	H	C	I	C	E	G	E	F

D	A	C	A	C	D	F	G	F

Trial 5

A	B	C	D	E	F	G	H	I
2	9	4	1	7	5	3	8	6

E	I	G	A	B	G	C	D	A

E	B	G	D	G	C	I	A	E

C	D	G	B	D	E	H	A	F

B	A	C	B	I	B	F	A	G

Trial 6

A	B	C	D	E	F	G	H	I
2	9	4	1	7	5	3	8	6

B	G	F	B	A	F	E	C	G

I	B	C	B	F	E	D	C	E

D	E	C	B	F	I	B	A	D

A	B	C	H	C	E	A	D	C

Trial 7

A	B	C	D	E	F	G	H	I
2	9	4	1	7	5	3	8	6

A	E	C	H	I	A	B	H	E

B	H	B	A	G	C	F	H	D

G	H	D	C	D	E	G	H	D

D	F	I	E	B	C	G	A	F

Trial 8

A	B	C	D	E	F	G	H	I
2	9	4	1	7	5	3	8	6

B	C	D	A	F	H	C	H	F

H	I	A	D	B	C	I	D	E

F	G	E	A	I	D	C	A	H

Trial 9

A	B	C	D	E	F	G	H	I
2	9	4	1	7	5	3	8	6

B	F	D	G	A	F	G	C	I

I	C	D	B	G	F	E	B	H

G	A	H	D	F	H	D	G	F

B	H	I	E	D	I	B	C	H

Trial 10

A	B	C	D	E	F	G	H	I
2	9	4	1	7	5	3	8	6

G	H	A	B	I	A	F	D	B

E	A	B	H	E	I	A	D	H

F	D	I	A	I	E	B	C	G

I	A	C	F	D	I	H	G	D

Trial 11

A	B	C	D	E	F	G	H	I
2	9	4	1	7	5	3	8	6

E	A	H	G	I	H	B	C	D

D	E	F	D	G	A	I	D	E

F	E	I	E	H	C	B	I	F

F	E	H	I	B	F	I	A	C

Trial 12

A	B	C	D	E	F	G	H	I
2	9	4	1	7	5	3	8	6

B	D	H	G	I	E	I	C	H

A	B	E	H	F	C	F	G	F

D	I	D	G	B	H	C	F	D

B	A	C	A	F	E	I	B	D

Trial 13

A	B	C	D	E	F	G	H	I
2	9	4	1	7	5	3	8	6

D	H	I	A	C	G	D	F	C

G	A	B	G	H	E	G	F	I

F	D	A	C	H	B	H	I	B

C	F	D	F	E	A	B	G	H

Trial 14

A	B	C	D	E	F	G	H	I
2	9	4	1	7	5	3	8	6

D	I	C	E	D	C	H	E	B

E	C	D	A	E	A	I	C	E

I	G	D	I	H	B	C	H	E

C	G	I	F	A	I	E	F	D

Trial 15

A	B	C	D	E	F	G	H	I
2	9	4	1	7	5	3	8	6

F	A	C	E	B	I	D	B	A

H	D	F	A	B	G	D	H	E

C	I	A	H	E	H	F	G	I

F	H	A	E	A	B	G	B	E

Trial 16

A	B	C	D	E	F	G	H	I
2	9	4	1	7	5	3	8	6

G	F	A	F	A	I	B	G	B

C	H	A	F	H	A	G	C	G

A	I	B	F	A	E	D	F	C

G	A	H	G	F	G	I	G	C

Trial 17

A	B	C	D	E	F	G	H	I
2	9	4	1	7	5	3	8	6

G	B	E	I	B	C	B	D	C

I	B	F	D	A	B	G	F	E

G	C	D	E	G	D	E	C	G

I	G	F	D	E	H	D	B	I

Trial 18

A	B	C	D	E	F	G	H	I
2	9	4	1	7	5	3	8	6

H	D	C	A	F	E	A	B	A

I	C	D	G	D	F	E	I	C

I	B	E	A	I	D	H	F	H

E	D	I	F	C	A	I	F	C

All of the letters and numbers were typed in lower case on a primary size typewriter (Trade name: The Sight Saver - - 16 point type, 6 letter pitch).

Each trial, consisting of 36 items, was typed on separate sheets of 8 1/2" by 11" white unlined bond paper. The 5 rows, demonstration and 4 rows of 9 task items each, were centered horizontally and spaced equidistantly vertically on the page. Horizontally, there were two spaces between items. A spirit duplicating process was employed in reproducing the necessary number of sets of the complete task.

Construction

The task consisted of 9 paired associates. The stimulus members of the pairs were the first 9 letters of the alphabet; the response members, the digits 1 through 9. The letters and digits were paired on a random basis. As a result, there was no systematic sequence between the 2 series of material which were paired arbitrarily.

Held constant from trial to trial was the format of the demonstration illustrating the paired associates. On the other hand, the stimulus material in the task items per se was varied on a random basis. The purpose of this randomization was to ensure that within a trial or between trials no consistent sequence of stimuli occurred.

Procedure and Directions

Rote Learning Non-Verbal Task

This task involves the rote learning of nine arbitrarily paired stimulus-response combinations. The comments about the process involved in the Rote Learning Verbal task apply also to this task.

Scoring is identical to that used on the other non-verbal tasks. There are no number of responses scores. For time scores, start the watch when the subject begins the initial item, stop the watch when he completes the final item. Attainment time is the total time (rounded to the nearest second) required to complete a trial. Reported time is attainment time +100.

The procedure and directions for the subjects appear below.

Here is a test using letters and numbers. On this first page is an example. See the letters in these boxes across the top. And then, see the numbers in the boxes across the bottom. Each of these letter-number pairs goes together. Each number stands for a letter. In other words, A goes with 2, B goes with 9, (Continue through the list).

Now look at this second row. Here you see that the boxes at the top have the letters in them; but the numbers are missing from the boxes at the bottom. Also, the letters are in mixed up order. Your job is to write in the missing numbers. You are to write in the number that goes with each letter. Now, look at the first letter here. It's G. What number goes with it? That's right, the number which goes with it is 3. You write a 3 in the box under the G. All right, look at the second letter. What is it? That's right. It's F. Now, what number goes with F? That's right. Five goes with F. Now you know what to do. Fill in the rest of the boxes. You may look at the example across the top as often as you need to find out what numbers and letters go together. (Check to see that the subject fills in the correct responses.)

Now, turn the page. See this page is like the last one except that there are more lines of boxes with the numbers missing. And in every line the letters are in mixed-up order. However, this box across the top tells you what letters go with what numbers. The letter-number pairs always remain the same. You are to fill in all of the empty boxes at the bottom and you can look at the example at the top as often as you need to. Are you sure you understand? (If so, begin the task. If not, clarify further.)

Speed and Accuracy Directions

Now you know what to do. You are to try to get them all right as quickly as you can. Sometimes your teacher may ask you to work as fast as you can or to do as many as you can. Then you try to get all of the problems right as fast as you can. Well, that's what you are supposed to do with this test. The faster you can do them right, the better score you make.

Begin Trial One

Now let's begin the first trial. Fill in the right numbers which go with each letter. You can look at the example at the top of the page as often as you need to.

Peformance Information--Speed and Accuracy Control

That trial took you ______seconds (Reported score = attainment time +100.) Your score was ______seconds. You got them all right in ______ seconds.

Begin Trial Two

Here is the next trial. Remember you are supposed to get all of the problems right as fast as you can. The less time you take, the faster you are, and the faster you do the problems right the better score you get.

Performance Information--Speed and Accuracy Control

(Repeat comments used above pertinent to performance information.)

Reinforcement Schedule

C6 (D1 and D2): for the remaining trials, continue this same procedure for task administration, etc.

C1--C5 (D1 and D2): at the end of trial 2, administer the level of aspiration directions.

C5 (D1 and D2): for the remaining trials, continue procedure for task administration, speed and accuracy directions, and level of aspiration directions, and administer level of aspiration control performance information.

C1--C4 (D1 and D2): for the remaining trials, continue procedure for task administration, speed and accuracy directions, level of aspiration directions, and administer, in appropriate cases, the respective sets of differential success and failure performance information.

References

Johnson, G. O. and Blake, K. A. Learning performance of retarded and normal children. Syracuse, N. Y. : Syracuse University Press, 1960.

APPENDIX G

THE CONCEPT FORMATION VERBAL TASK: MATERIALS, CONSTRUCTION, PROCEDURE, AND DIRECTIONS

Materials

The 72 items of the Concept Formation Verbal Task are listed below in the order in which they were presented to the subjects. During the administration of the task each combination of category name and response alternates which comprised an item was contained on a separate card.

Example

Item	Category Name	Response Alternates			
A	zippo	board	market	Monday	bag
B	zippo	Thursday	red	gate	tin
C	zippo	flag	Tuesday	post	stripe
D	zippo	Wednesday	blue	prize	band
E	zippo	flame	bridge	Sunday	nap

Trial Number	Item	Category Name	Response Alternates[1]			
1.	a	sebi	banana	church	six	radio
	b	mufa	face	carpenter	pine	chapter
	c	bafo	pheasant	page	drum	calf
2.	a	mufa	part	oak	clown	hair
	b	bafo	sled	monkey	evening	sparrow
	c	sebi	twenty	telephone	pocket	garage
3.	a	sebi	secret	tent	cup	eleven
	b	mufa	shoulder	girl	snow	yellow
	c	bafo	marbles	green	fox	owl
4.	a	mufa	hay	finger	tire	hunter
	b	sebi	blanket	den	zero	fence
	c	bafo	buffalo	apple	duck	horn
5.	a	bafo	stork	coat	mouse	puzzle
	b	mufa	wind	comb	conductor	skin
	c	sebi	third	mop	camp	work
6.	a	sebi	fork	corner	thousand	house
	b	bafo	wagon	horse	gift	pigeon
	c	mufa	jaw	parade	river	messenger
7.	a	mufa	thorn	noon	toe	baby
	b	sebi	curtain	twelve	egg	stable
	c	bafo	dollar	balloon	parrot	deer
8.	a	bafo	squirrel	wren	tricycle	blue
	b	sebi	bottle	pipe	one	hotel
	c	mufa	acorn	leg	bean	nurse

Trial Number	Item	Category Name	Response Alternates			
9.	a	sebi	ninth	nut	button	pillow
	b	mufa	playmate	morning	eye	lily
	c	bafo	dominoes	bear	today	turkey
10.	a	mufa	tongue	leader	rain	drink
	b	bafo	shoe	scooter	rabbit	lark
	c	sebi	carrot	toaster	wigwam	two
11.	a	sebi	dish	pole	forty	castle
	b	mufa	farmer	knee	peach	wood
	c	bafo	pound	doll	sea gull	dog
12.	a	bafo	blocks	goat	wool	woodpecker
	b	mufa	baker	mud	head	airplane
	c	sebi	five	cabin	trap	glass
13.	a	mufa	mouth	man	shell	breakfast
	b	bafo	chalk	skates	camel	robin
	c	sebi	bucket	candy	apartment	eight
14.	a	bafo	lion	checkers	penny	pelican
	b	mufa	yard	surprise	doctor	tooth
	c	sebi	barn	three	grade	television
15.	a	mufa	grocer	sign	arm	pasture
	b	sebi	dress	inn	plate	first
	c	bafo	rooster	chipmunk	gasoline	bicycle
16.	a	bafo	elephant	hawk	football	west
	b	sebi	shed	seven	north	lamp
	c	mufa	fireman	coffee	ear	moon
17.	a	bafo	swan	east	giraffe	top
	b	sebi	hundred	cave	hot	napkin
	c	mufa	beach	neighbor	ribbon	hand
18.	a	mufa	singer	brown	neck	storm
	b	sebi	store	fifteen	milk	kettle
	c	bafo	dove	rattle	spade	tiger
19.	a	mufa	root	chin	sound	boy
	b	bafo	pig	swallow	swing	pair
	c	sebi	sheet	night	building	four
20.	a	sebi	clock	thirteen	tar	palace
	b	bafo	truck	kite	eagle	kangaroo
	c	mufa	lip	bloom	pack	king
21.	a	mufa	friend	foot	orange	moss
	b	sebi	school	month	pan	nine
	c	bafo	zebra	crow	whistle	potato

Trial Number	Item	Category Name	Response Alternates			
22.	a	bafo	parakeet	ship	elk	bat
	b	sebi	cottage	second	crown	spoon
	c	mufa	sail	rock	driver	throat
23.	a	sebi	ten	trailer	sweater	mirror
	b	mufa	lady	nose	tree	collar
	c	bafo	seesaw	dinner	hen	cat
24.	a	bafo	goose	wolf	paint	tea set
	b	mufa	white	seed	captain	elbow
	c	sebi	broom	hospital	fifty	cracker

All of the nonsense syllables and words were typed in lower case letters on a primary size typewriter (Trade name: The Sight Saver - - 16 point type, 6 letter pitch.)

Each item was typed on a 5" x 8" white unlined card. The item was centered horizontally on the card; the category name was 1/2" from the left margin, the first response alternate was 3/4" from the category name, and the 4 alternates were placed equidistantly in the remaining space. A spirit duplicating process was employed to reproduce the required number of sets of item cards.

Construction

The object nouns were selected from the words contained in the Gates Primary Word List (1935). A list was made of every common noun included in the Gates material. These were classified into the following categories: household, shelter, time, number, people, parts of people, animals, birds, nature (excluding animals and birds), toys, food, school, transportation, tools, quantity (excluding number *per se*), clothes, direction, color, and miscellaneous (all nouns not applicable to the preceding categories).

After several series of pilot tests were conducted the number, animal, and parts of people categories were designated as those to contain the correct response alternates. Six additional categories were selected for parallel presentation with the above listed categories. All of the remaining categories were pooled to form one miscellaneous category. Thus, there were 3 series of categories. The first series included the categories animals, birds, toys, and miscellaneous; the second series, the categories parts of people, people, nature, and miscellaneous; the third series, the categories number, household, shelter, and miscellaneous. The animal category was designated the bafo category and the parallel categories of nouns in the first series were used only as the response alternates in the bafo items. Similarly the parts of people category became the mufa category and the parallel categories of the second series were employed as the response alternates in the mufa items; the number category was the sebi category and the parallel categories of third series were used as the response alternates in the sebi items.

Twenty-four nouns were selected from each category in the 3 series. These were the nouns finally used in the task. To ensure that no alphabetical or other sequence obtained, the 24 nouns in each category were written on cards and these cards were shuffled thoroughly. In addition, to prevent position bias, the horizontal position of the categories in each item series and the vertical position of the three items were irregularized over the 24 trials. This was done in a way that the correct alternates appeared with equal frequency in each horizontal position, the several items appeared with aqual frequency in each vertical position, and the horizontal position of each correct response alternate was not identical in any two consecutive trials.

Procedure and Directions

Concept Formation Verbal Task

zippo - - days of the week; bafo - - animals; mufa - - parts of people; sebi - - numbers.

This task involves concept formation. As such, the subject must ignore concrete, peripheral differences in object nouns and group on the basis of an intrinsic, underlying class characteristic or categorical relationship. N. B. It is extremely important that the subject understand this idea of process in the example. If at any time during the task he appears to be confused about what is expected of him, reiterate the explanation.

Scoring is like the Discrimination Learning Verbal Task. Start the watch with presentation of the first item; stop it when the subject makes the correct response; start it at the beginning of the next item; stop it at the correct response to the item, etc. Attainment time is the total time (rounded to the nearest second) required for the 3 items. Reported time is attainment time +100. Also record the total number of responses made on the 3 items.

The procedure and directions to be used with the subjects appear below.

In this test you will work with word relatives. Word relatives are words which belong together in some way; they are members of the same family. (Discuss with the subject his personal relatives: aunts, uncles, mother, father, brothers. Stress that all are different, all have different names, but all belong together in some way -- they are members of the same family; i.e. all are object nouns which can be grouped into one class on the basis of the categorical characteristic - - family.)

Your job in this test is to find some groups of word relatives which I tell you the family names for. Let's start with an example. Let's work it together so that you will know how to do the test when you come to it.

Look at this first card. See this word over here on the left hand side of the card; it has a line under it. It's zippo. You've probably never heard that word before; it's a made-up word. Look at the line of words on the right. They are board, market, Monday, bag. (Read the words aloud.) One of these words belongs to the zippo family. It goes with zippo. Now, you find out which one it is. Begin by guessing, and I'll tell you whether you are right or wrong. (Say "right" after the week day word, and "wrong" after the other three. When the subject guesses the correct word, proceeed to the next card). That's right. The zippo word is Monday.

Now, let's look at the next card. Find the member of the zippo family. Remember the last time we saw zippo; the right word was Monday. Here's zippo again. What word is going to go with zippo this time? Remember, it has to belong to the same family. All right, let's find the zippo word. (Read the four object nouns to the subject; have him guess.) Yes, that's right, Thursday. Monday and Thursday are both in the zippo family. Now let's look at the next card. What's the word which is in the zippo family with Monday and Thursday? (Continue the same procedure through the 5 cards.)

You found all of the members of the zippo family. Each zippo word was different from the other zippo words in many ways; but they were all alike in one way; they were all days of the week. They belonged together in one way; they were members of the same family: days of the week. So all of the members of the zippo family were different in many ways, but alike in being members of the same family. (Be sure that the subject can understand the idea of ignoring specific object characteristics to grasp the categorical characteristic which defines the class.)

Let's begin the test. In the test there are three families: the bafo family, the mufa family, and the sebi family. You are to discover the members of each of these word families; the word relatives which belong together in some way. Begin by guessing, and I'll tell you whether your guesses are right or wrong. Are you sure you understand what to do? (If so, begin the task; if not, further discuss the example.)

Speed and Accuracy Directions

Now you know what to do. You are to try to get them all right as quickly as you can. Sometimes your teacher may ask you to work as fast as you can or to do as many as you can. Then you try to get all of the problems right as fast as you can. Well, that's what you are supposed to do with this test. The faster you can do them right, the better score you make.

Begin Trial One

Now let's begin the first trial. (Read the class name and four object words. Have the subject guess. If the guess is incorrect, say--) No, that is not the bafo /or other/ word. It doesn't belong to the bafo family, etc. (If the guess is correct, make the opposite comments.)

Performance Information--Speed and Accuracy Control

That trial took you _____seconds (Reported score=attainment time +100.) Your score was _____seconds. You got them all right in _____ seconds.

Begin Trial Two

Here is the next trial. Remember you are supposed to get all of the problems right as fast as you can. The less time you take, the faster you are, and the faster you do the problems right the better score you get.

Performance Information--Speed and Accuracy Control

(Repeat comments used above pertinent to performance information.)

Trials two Through Eight

(Continue this same procedure for task administration, speed and accuracy directions, and speed and accuracy control performance information.)

Reinforcement Schedule

C6 (D1 and D2): for the remaining trials, continue this same procedure for task administration, etc.

C1--C5 (D1 and D2): at the end of trial 8, administer the level of aspiration directions.

C5 (D1 and D2): for the remaining trials, continue procedure for task administration, speed and accuracy directions, and level of aspiration directions, and administer level of aspiration control performance information.

C1--C4 (D1 and D2): for the remaining trials, continue procedure for task administration, speed and accuracy directions, level of aspiration directions, and administer, in appropriate cases, the respective sets of differential success and failure performance information.

References

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APPENDIX H

THE CONCEPT FORMATION NON-VERBAL TASK: MATERIALS, CONSTRUCTION, PROCEDURE, AND DIRECTIONS.

Materials

The items included in the example and the 18 trials of the Concept Formation Non-Verbal Task are presented below in the order in which they were administered to the subjects. During the actual task administration, these were contained on separate sheets and the 19 sheets were stapled together to form a task booklet.

Example

___+a	=-a-	)6	√-6-
___ a			
___ -6-			
___ -a-			
___ 6			
___ --d-			
___ 4			
___ y			
___ -8-			

Trial 1

___+a	=-a-	)6	√-6-
___ f	___ 2	___ p	___ -3--
___ 3	___ -5-	___ -w-	___ -x-
___ -s-	___ j	___ 4	___ 8
___ -9-	___ -y-	___ -6-	___ v
___ 5	___ -u-	___ -8-	___ -4-
___ -7-	___ -s-	___ -i-	___ -7-
___ a	___ b	___ 9	___ -k-

Trial 2

___+a	=-a-	)6	√-6-
___ -4-	___ n	___ 8	___ -y-
___ -x-	___ -i-	___ -5-	___ -7-
___ 6	___ 3	___ t	___ p
___ b	___ -8-	___ -r-	___ 9
___ -z-	___ -f-	___ 7	___ k
___ a	___ 8	___ n	___ 4
___ -e-	___ -9-	___ -6-	___ -y-

Trial 3

+a	= -a-	) 6	✓ -6-
___ v	___ -5-	___ -a-	___ 7
___ -a-	___ -p-	___ -7-	___ -2-
___ 3	___ z	___ t	___ c
___ -9-	___ q	___ 5	___ -d-
___ -w-	___ -6-	___ j	___ 4
___ i	___ 9	___ 8	___ f
___ -3-	___ -u-	___ -8-	___ -8-

Trial 4

+a	= -a-	) 6	✓ -6-
___ 3	___ t	___ -3-	___ -s-
___ f	___ 5	___ 4	___ -8-
___ -5-	___ -x-	___ -h-	___ 2
___ -d-	___ -4-	___ -a-	___ -9-
___ -p-	___ 7	___ q	___ -b-
___ -2-	___ -6-	___ -e-	___ 6
___ z	___ n	___ 8	___ -k-

Trial 5

+a	= -a-	) 6	✓ -6-
___ -6-	___ j	___ r	___ -5-
___ -f-	___ a	___ -m-	___ 7
___ 8	___ -8-	___ 4	___ -q-
___ y	___ 2	___ -9-	___ c
___ 5	___ w	___ -v-	___ 3
___ -2-	___ 9	___ -7-	___ g
___ b	___ -d-	___ x	___ -4-

Trial 6

+a	= -a-	) 6	✓ -6-
___ 4	___ -f-	___ -u-	___ -8-
___ -g-	___ -4-	___ q	___ 3
___ y	___ h	___ -3-	___ -i-
___ -e-	___ 7	___ 9	___ a
___ 2	___ t	___ -6-	___ n
___ b	___ 8	___ -k-	___ -r-
___ -2-	___ -n-	___ 5	___ -5-

Trial 7

___+a	___= ~~a~~	___) 6	___√ ~~6~~
___~~8~~	___~~6~~	___3	___~~4~~
___2	___~~r~~	___x	___h
___~~b~~	___p	___7	___6
___c	___~~3~~	___a	___q
___f	___9	___~~2~~	___4
___~~k~~	___~~5~~	___~~w~~	___~~t~~
___5	___i	___~~d~~	___~~7~~

Trial 8

___+a	___= ~~a~~	___) 6	___√ ~~6~~
___~~5~~	___~~r~~	___~~m~~	___~~3~~
___~~d~~	___~~s~~	___~~4~~	___a
___3	___x	___z	___6
___b	___~~8~~	___~~p~~	___~~6~~
___9	___7	___2	___8
___~~2~~	___h	___~~7~~	___~~k~~
___r	___5	___~~y~~	___f

Trial 9

___+a	___= ~~a~~	___) 6	___√ ~~6~~
___b	___~~q~~	___5	___~~g~~
___2	___~~a~~	___~~2~~	___7
___~~e~~	___~~8~~	___~~n~~	___p
___~~4~~	___v	___h	___8
___6	___9	___~~5~~	___r
___~~6~~	___x	___3	___~~9~~
___m	___~~y~~	___~~9~~	___~~t~~

Trial 10

___+a	___= ~~a~~	___) 6	___√ ~~6~~
___~~4~~	___~~w~~	___~~a~~	___t
___8	___4	___c	___5
___~~j~~	___~~9~~	___~~s~~	___~~e~~
___b	___3	___~~p~~	___~~3~~
___h	___~~5~~	___~~k~~	___7
___~~s~~	___~~d~~	___~~6~~	___~~8~~
___6	___9	___g	___a

Trial 11

___+a	___= ~~a~~	___) 6	___√ ~~6~~
___~~w~~	___~~6~~	___~~4~~	___~~z~~
___~~8~~	___8	___~~j~~	___6
___k	___~~2~~	___~~5~~	___~~7~~
___7	___a	___2	___~~b~~
___x	___~~p~~	___~~d~~	___c
___3	___5	___m	___~~9~~
___~~n~~	___g	___s	___w

Trial 12

___+a	___= ~~a~~	___) 6	___√ ~~6~~
___8	___~~a~~	___c	___9
___b	___~~5~~	___7	___~~6~~
___~~3~~	___r	___~~i~~	___t
___~~f~~	___4	___~~4~~	___~~y~~
___~~9~~	___j	___~~w~~	___~~8~~
___~~d~~	___~~h~~	___x	___n
___6	___5	___~~7~~	___s

Trial 13

___+a	___= ~~a~~	___) 6	___√ ~~6~~
___~~b~~	___w	___8	___~~g~~
___c	___~~9~~	___[illegible]	___m
___~~4~~	___3	___f	___u
___6	___r	___2	___7
___~~7~~	___s	___~~k~~	___p
___~~k~~	___h	___~~3~~	___~~4~~
___9	___~~a~~	___5	___~~d~~

Trial 14

___+a	___= ~~a~~	___) 6	___√ ~~6~~
___4	___f	___2	___r
___z	___~~v~~	___~~5~~	___~~3~~
___~~3~~	___~~6~~	___t	___7
___~~h~~	___n	___5	___8
___~~8~~	___9	___~~y~~	___~~9~~
___6	___b	___~~2~~	___i
___~~e~~	___~~w~~	___~~u~~	___~~n~~

Trial 15

___+a	___=-a-	) 6	√-6-
___-d-	___-4-	___e	___3
___c	___5	___8	___-9-
___-5-	___-g-	___-r-	___s
___4	___u	___-3-	___-h-
___-s-	___m	___6	___-p-
___-b-	___-k-	___-7-	___n
___7	___z	___-f-	___-8-

Trial 16

___+a	___=-a-	) 6	√-6-
___-6-	___z	___-7-	___w
___-a-	___b	___6	___-8-
___4	___-x-	___5	___-m-
___t	___8	___-3-	___-g-
___-9-	___-2-	___d	___-5-
___2	___-v-	___-y-	___k
___-h-	___p	___9	___3

Trial 17

___+a	___=-a-	) 6	√-6-
___3	___6	___d	___-z-
___y	___n	___-u-	___9
___-4-	___5	___-8-	___-4-
___-e-	___-p-	___7	___-x-
___-j-	___-2-	___-h-	___r
___-3-	___2	___a	___-9-
___g	___-5-	___f	___8

Trial 18

__+a	__=-a-	__) 6	__√-6-
___e	___8	___-3-	___-r-
___-9-	___-6-	___9	___m
___x	___q	___-k-	___-7-
___3	___-g-	___c	___4
___d	___6	___f	___-8-
___5	___s	___-i-	___-n-
___-v-	___-z-	___z	___-5-

All of the letters and numbers were typed in lower case on a primary size typewriter (Trade name: The Sight Saver - - 16 point type, 6 letter pitch).

The 28 items of each trial were typed on separate sheets of 8 1/2" by 11" white unlined bond paper. Four columns, each containing 7 items, were spaced equidistantly on the page. Vertically, there were 2 spaces between each item.

A spirit duplicating process was used in reproducing the necessary number of sets of the complete task.

Construction

Four categories of stimuli were employed. These included letters, struck through letters, numbers, and struck through numbers. These categories were represented by four symbols: cross, parallel horizontal lines, half circle, and check, respectively. Each trial included 7 representatives of each category.

The letters and the struck through letters were selected from 24 letters of the alphabet; the l and the o were excluded. The numbers and struck through numbers were drawn from the number sequence from two to nine; the zero and one were excluded. The purpose of the exclusions in both cases was to prevent confusion of the letters l and o with the typed numbers one and zero. In any one trial, 7 different letters were drawn from the 24 possibilities for each of the 2 categories; there was no overlap of letters in a trial. The specific letters used in each category were varied from trial to trial. In each trial the 7 digit possibilities were used twice.

In order to preclude the occurrence of a systematic sequence, an irregular order was followed in the vertical arrangement of representatives of the 4 classes.

Procedure and Directions

Concept Formation Non-Verbal Task

This task involves concept formation; therefore, the comments about the process involved in the Concept Formation Verbal Task apply here also.

Scoring is the same as that used on the Discrimination Learning Non-Verbal and Rote Learning Non-Verbal Tasks. There are no number of responses scores. For time scores, start the watch as the subject begins the first item and stop the watch when he completes the final item. Attainment time is the total time (rounded to the nearest second) required to complete a trial. Reported time is attainment time + 100.

The procedure and directions to be employed with the subjects are cited below.

Today we have a test in which you are to learn what figures go with a group of things. We have four groups: a group of letters which stand alone, a group of letters with lines drawn through them, a group of numbers which stand alone, and a group of numbers with lines through them. And we have four symbols or figures: a cross, two short lines, a half circle, and a check mark. (point out as named.)

Now look at the example. Here, the cross goes with the letter a; actually, the cross goes with any letter of the alphabet which stands alone: a, b, c, d, and all the rest. The two lines go with the letter a with a line through it; and so, any letter with a line through it has two lines in front of it. The half-circle goes with the 6; actually the half-circle goes with any number which stands alone: 6, 7, 1, 3, and the other numbers. The check goes with any number with a line through it.

Look at the column. Here you see numbers and letters: some stand alone and some have lines through them. Also, they are all mixed up. And, there is a blank space before each one. The figure has been left out. Your job is to write in the missing figure. You are to write in the figure that belongs in each blank. Look at the first one. It's a letter standing alone. What figure should be filled in? That's right, the cross. Now, look at the second one. It's a number with a line through it. What figure belongs in the blank? That's right, the check. (Continue through the column.)

So you see, the whole group of letters standing alone goes with the figure, cross; when you see any letters standing alone, you fill in a cross. The letters with lines through them go with the two lines; whenever you see any letter with a line through it, you fill in two lines. (Continue these same comments with numbers alone, and with struck through numbers.) You may look at the example at the top of the page as often as you need to find out what figures should be in the blank space. (Be sure the subject understands.)

Now turn the page. This page is a lot like the last one. However, here you have more columns in which you are to fill in the blank spaces, many more numbers and letters are used, and these are all mixed up as far as order goes. However, the line across the top is the same and it tells you what figures go with what groups. The numbers or letters in any group-will change; but, the figure which goes with the whole group will stay the same. Do you have any questions? (If so, explain furtner; if not, begin the task.)

Speed and Accuracy Directions

Now you know what to do. You are to try to get them all right as quickly as you can. Sometimes your teacher may ask you to work as fast as you can or to do as many as you can. Then you try to get all of the problems right as fast as you can. Well, that's what you are supposed to do with this test. The faster you can do them right, the better score you make.

Begin Trial One

Now let's begin the first trial. Fill in the right figures in each blank. You can look at the example as often as you need to.

Performance Information--Speed and Accuracy Control

That trial took you _____ seconds (Reported score = attainment time +100.) Your score was _____ seconds. You got them all right in _____ seconds.

Begin Trial Two

Here is the next trial. Remember you are supposed to get all of the problems right as fast as you can. The less time you take, the faster you are, and the faster you do the problems right the better score you get.

Performance Information--Speed and Accuracy Control

(Repeat comments used above pertinent to performance information.)

Reinforcement Schedule

C6 (D1 and D2): for the remaining trials, continue this same procedure for task administration, etc.

C1--C5 (D1 and D2): at the end of trial 2, administer the level of aspiration directions.

C5 (D1 and D2): for the remaining trials, continue procedure for task administration, speed and accuracy directions, and level of aspiration directions, and administer level of aspiration control performance information.

C1--C4 (D1 and D2): for the remaining trials, continue procedure for task administration, speed and accuracy directions, level of aspiration directions, and administer, in appropriate cases, the respective sets of differential success and failure performance information.

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